

for the westernmost sampling location (GC-03), located in the dredged area, detected arsenic at a maximum concentration of 15.9 mg/kg and lead at 181 mg/kg. VOCs were not detected in this location; except for acetone in very low concentrations. In general, the third sampling event results when compared to the two previous events, indicated decreasing levels of SVOCs, although an increase was detected in the easternmost sampling location (maximum concentrations of benzo(a)anthracene and benzo(a)pyrene 2,300 and 1,900 ug/kg, respectively). Low levels of pesticides continue to be found in the Creek, and PCBs were also recorded in concentrations ranging from 69 to 240 ug/kg. Analyses were not performed for radionuclides from the uranium and thorium series, but previous sampling has indicated no radioactive contamination above background levels.

SUMMARY OF SITE RISKS

Based upon the results of the RI and the FFS, baseline risk assessments were conducted to estimate the human and ecological risks associated with current and future Site conditions. A baseline risk assessment estimates the human health and ecological risk which could result from the contamination at the Site, if no remedial action were taken.

The assessments conducted for this Site include separate chemical and radiological risk assessments for both human health, as well as for flora and fauna. For human health, risks were estimated for current receptors, as well as for future receptors in both residential and commercial scenarios. EPA believes that, based on historical uses of the Li Tungsten and Captain's Cove properties and the City's Glen Cove Creek Revitalization Plan, the most reasonably anticipated future land use of the Li Tungsten Site is most likely to be commercial. However, EPA evaluated residential as well as commercial future risks and hazards to populations, primarily as a result of a request from the Li Tungsten Task Force to evaluate the risk to potential future residential populations on the Site. Separate cancer risks were evaluated for both chemical and radiological exposures, and a total cancer risk was also calculated and is presented in the Tables for the main chemical contributors. In addition, noncancer human health hazards were evaluated for chemical exposures. The general methodology used in performing human health risk assessment is presented below.

Human Health Risk Assessment

A four-step process is utilized for assessing Site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification*--identifies the contaminants of concern at the Site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment*--estimates the magnitude of actual and/or potential human exposures, the frequency and duration

of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment*--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization*--summarizes and combines results of the exposure and toxicity assessments to provide a quantitative assessment of Site-related risks.

Current Federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk to a reasonably maximally exposed individual in the range of 10^{-4} to 10^{-6} (e.g., a one-in-ten-thousand to a one-in-a-million excess cancer risk or likelihood of an additional incidence of cancer) and a Hazard Index (HI) (which reflects noncarcinogenic effects for a human receptor) equal to 1.0. An HI greater than 1.0 indicates a potential for noncarcinogenic health effects.

For purposes of the risk assessment, the Li Tungsten facility was separated into the following areas:

Area A	= Parcel A
Area B	= lower Parcel B
Area B + C	= middle/upper Parcel B combined with middle/ upper Parcel C
Area C	= lower Parcel C

The Captain's Cove property was separated into Area A and Area G. For both properties, the groundwater data is Site-wide.

Hazard Identification

During data evaluation, relevant site information is compiled and analyzed, in order to select contaminants of concern (COC). For the Li Tungsten Site, several radionuclides, inorganic chemicals, and organic compounds meeting appropriate QA/QC requirements were selected as COCs because of the potential hazard they pose to human health and the environment under current and future conditions. Predominant contributors to the risk estimates for contaminated soil calculated at both the Li Tungsten facility and Captain's Cove property included inorganic chemicals such as arsenic, manganese, cobalt, lead and antimony, as well as thorium and uranium series radionuclides. Predominant contributors to hypothetical groundwater risks were VOCs such as trichloroethylene, tetrachloroethylene, chloroform, methylene chloride, and vinyl chloride, and inorganics such as arsenic and antimony.

Soil data (i.e., surface soil and a composite of samples across various depths) were evaluated to determine risk at the Li Tungsten facility by dividing the Site into four areas (Areas A, B, B + C,

and C) to more realistically assess inhalation risks to nearby receptors, as well as to evaluate exposures from areas of similar contaminants, e.g., the ore dumping areas of middle/upper Parcel B and middle/upper Parcel C.

The COCs were selected based on chemicals exceeding the upper bound of the cancer risk range (i.e., 1 in 1,000,000) or a Hazard Index of 1. The COCs are categorized based on areas and parcels for soil and site-wide data for groundwater. **Tables 5A-F** summarize the COCs, and exposure point concentrations for each of the COCs detected in soil at the Li Tungsten facility. Exposure point concentrations (EPCs) are defined as the concentrations used in estimating the exposure. Separate EPCs were developed for each COC in the soil, sediment, surface water and groundwater for specific portions of the Site. Separate modeling of air particulates for the off-site resident and worker were calculated and are shown in **Table 5F**. The tables include the range of concentrations detected for each COC, as well as the frequency of detection, the EPC, and the derivation of the EPC. Arsenic, antimony, lead and manganese had the highest frequency of detection in soil. Volatile organic compounds (VOCs) including benzene, vinyl chloride, and trichloroethylene were the primary chemicals found in groundwater.

For the Captain's Cove property, **Tables 6A-E** summarize the COCs, frequency of detection, and EPC for the COCs. A similar categorization scheme was used for Areas A and G on the property and for the site-wide groundwater COCs.

Exposure Assessment

Exposure point concentrations were calculated from soil sample data sets to represent the reasonable maximum exposure (RME) to various current and hypothetical future individuals on and around the Li Tungsten facility and Captain's Cove property. **Tables 7 and 8** provide conceptual site models of potential exposures for Li Tungsten and Captain's Cove, respectively. Specifically, current exposures were calculated for children and adults living off-Site (i.e., at the boundaries of the property) who may be exposed through wind-blown dust. The dust EPC was calculated using the results of the Industrial Source Complex Short-term model. Other populations evaluated include: adolescent trespassers who may enter the property without authorization and hypothetical future individuals such as adult and child residents, adolescent trespassers, Site workers and construction workers at both properties. Future residential receptors were evaluated primarily for reference value, since EPA believes that the future use of the Site will be commercial.

At the Li Tungsten facility, the exposures evaluated included soil and groundwater ingestion and dermal contact at ground surface and

a. composite sample of several soil borings at depth. Other routes of exposure include: future residential use of groundwater including inhalation of volatilized organics while showering. The air concentrations in the shower were modeled. Off-Site residents may also be exposed through inhalation of wind-blown dust based on modeled concentrations. Other exposed populations include: construction workers who would be on the property for a shorter period of time than the on-Site workers who were also evaluated.

For the Captain's Cove property, similar populations were evaluated i.e., child and adult future resident, adolescent trespasser, on-Site worker, and construction worker. Table 8A and 8B provide conceptual models for the radiological portion of the assessment as well as the chemical assessment, respectively.

Many of the soil sample locations were biased, i.e., they were selected due to the presence of elevated levels of contaminants. Therefore, the values calculated on those data sets are a conservative estimate of the RME. In addition, the wind-blown dust concentrations were modeled using the Industrial Source Complex Short-term model.

In addition to the calculation of exposure point concentrations (Tables 5A-F and 6A-F), several Site-specific assumptions regarding future land-use scenarios and exposure pathways, e.g., inhalation, ingestion, and dermal contact, were made. Assumptions were based on Site-specific conditions to the greatest degree possible, and default parameter values found in EPA risk assessment guidance documents were used in the absence of Site-specific data.

Toxicity Assessment

Standard dose conversion factors, oral and inhalation cancer slope factors, and oral and inhalation reference doses were used to estimate the carcinogenic and noncarcinogenic hazards associated with Site contaminants. Tables 9A-E (Li Tungsten) and 10A-E (Captain's Cove) provide the chronic toxicity information for the COCs based on information in the Integrated Risk Information System (IRIS), the 1997 Health Effects Assessment Summary Tables, and EPA's National Center for Environmental Assessment Superfund Technical Support Team. The risk estimators used in this assessment are accepted by the scientific community as representing reasonable projections of the hazards associated with exposure to the various COCs.

At this time, cancer slope factors and Reference Doses are not available for the dermal route of exposure. Thus, the dermal slope factors used in the assessment have been extrapolated from oral values using appropriate adjustment factors based on data on the chemical's absorption. Adjustments in the oral cancer slope

factors and Reference Doses are listed in **Tables 9A and 10A** for the Li Tungsten facility and Captain's Cove property, respectively.

A number of chemicals lack adequate toxicity information to quantify the potential risks and hazards associated with exposure. A list of the chemicals not quantitatively evaluated are provided in the Li Tungsten RI and Captain's Cove FFS documents. Lack of data to quantify risks and hazards for these chemicals may potentially underestimate the risks and hazards at the Site.

Human epidemiological data on carcinogenesis from exposure to ionizing radiation are more extensive than that for most chemical carcinogens. The cancer slope factors were obtained from IRIS or the 1995 Health Effects Assessment Summary Tables consistent with EPA guidance.

Risk Characterization

The Risk Characterization summarizes the risks and hazards for chemical contaminants through various routes of exposure. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to carcinogens. Risk is a function of the chronic daily intake averaged over a 70-year period and the cancer slope factor that indicates the relative cancer potential of the chemical.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time with a Reference Dose. The Reference Dose represents a level that an individual may be exposed to that is not expected to cause any deleterious effects. The ratio of exposure to toxicity is represented as a Hazard Quotient. Hazard Quotients less than 1 indicate that a receptor's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely. The Hazard Index is the sum of multiple chemical exposures across multiple routes.

Li Tungsten Facility

The risks presented in **Tables 11A-F** for the Li Tungsten facility and **12A-E** for the Captain's Cove property summarize the cancer risks from chemical and radiological exposure for those chemicals and radionuclides with risks greater than 1 in 1,000,000. The analysis for individual receptors is identified based on Areas A, B, B + C, and C. Risks to the off-Site population and through groundwater were developed based on Site-wide groundwater information and an air dispersion model.

A similar procedure was followed for the evaluation of non-carcinogenic hazards. Tables 13A-F summarize the hazards for specific receptors based on exposure locations at the Li Tungsten facility. Tables 14A-F summarize the hazards for the non-carcinogenic chemicals.

Lead was evaluated qualitatively based on the 1994 OSWER Directive and a screening level of 400 mg/kg. A quantitative evaluation was not possible based on the lack of specific toxicity factors.

Chemical Risk

Table 11A-F and 13A-F summarize the risk and hazard estimates for the significant routes of exposure (i.e., inhalation, dermal, ingestion and external radiation) for various receptors at the Li Tungsten facility. These risk estimates are based on a reasonable maximum exposure and were developed by using various exposure assumptions based on route of exposure and individual exposures (i.e., child, adult, worker).

Chemical analyses of soil samples at the Li Tungsten facility showed that inorganics, e.g., heavy metals like arsenic, manganese, cobalt, antimony, and nickel, are present in all four areas at concentrations that may pose unacceptable risks and hazards depending on activities. These metals are the predominant contributors to unacceptable human health risks calculated for all areas of the Li Tungsten facility. The carcinogenic risks for these metals primarily exceeded 1×10^{-4} for arsenic through the ingestion, inhalation and dermal pathways. The risks through ingestion of Site-wide groundwater were also predominated by arsenic with VOCs also contributing to the total risk. The radionuclides also resulted in exceedences of the upper bound of the risk range i.e., 1×10^{-4} . These elevated risks were seen for current trespassers, and future land use including commercial development and residential land use. Risks to construction workers and future Site workers also exceeded the upper bounds of the risk range.

For several populations evaluated, including both residential and commercial scenarios, the total excess lifetime cancer risk and hazard indices that were estimated based on exposure to these contaminants exceeded the cancer risk range of 10^{-4} to 10^{-6} and the Hazard Index of 1 used in evaluating Superfund sites. For example, the future commercial Site worker's exposure to the chemicals of concern in Areas B + C during future commercial activities would result in an unacceptable cancer risk of 5×10^{-3} (or an increased risk of 5 in 1,000) based on specific exposure assumptions. Likewise, the same Site worker's exposure to heavy metals (primarily from arsenic) would contribute to a noncancer hazard index of 40. A future child resident's exposure to the chemicals

of concern in Area C would result in an unacceptable cancer risk of 6.0×10^{-3} and a noncancer HI of 300, as a result of exposure to arsenic and antimony. Likewise, a current off-Site child resident's exposure to the chemicals of concern from inhalation would result in a noncancer HI of 90, although this risk is based on highly conservative modeling and does not account for vegetative soil cover at the Site, which significantly reduces the potential for off-Site windblown transport of contaminated dust. A review of the calculated risks and hazards indicate that the most highly contaminated soil is located in Area B + C.

Potential exposure of an adolescent trespasser to ponded water and sediments on Parcels B and C also results in unacceptable hazard indices (4 and 7, respectively) due to the presence of arsenic. Hypothetical exposure to groundwater underlying the facility, although unlikely, would result in unacceptable cancer risks and hazard indices to residential occupants and commercial Site workers through ingestion, inhalation while showering, and dermal contact. The primary chemicals contributing to these risks include inorganics such as arsenic and volatile organics like trichloroethene, tetrachloroethene, and vinyl chloride. Exposure to the contaminated groundwater in the Upper Glacial Aquifer underlying the facility is considered unlikely because of the general availability of Glen Cove's municipal water supply. This supply, which is periodically tested to ensure its quality in accordance with New York State law, is pumped from the deeper Lloyd Aquifer at locations approximately one mile hydraulically up gradient from the Site.

At the Captain's Cove facility the chemical risks exceeded the upper bound of the risk range for future adult site workers i.e., 6 in 100 primarily based on arsenic exposure. The risks to the construction worker were elevated at 5 in 10,000 primarily based on arsenic exposure. Similar elevated risks were also found for the future adult and child residents.

The non-cancer hazards also exceeded 1 at the Li Tungsten and Captain's Cove properties. Tables 13A-F and 14A-F, respectively, summarize the hazards by specific organ groups. At Li Tungsten the hazards were consistently above 1 for each receptor group with arsenic as the primary contributor. Under the current scenario, the adolescent trespasser had an elevated hazard of 6 in Area B, 19 in Area B + C, and 5 in Area C. An elevated hazard of 4 from sediment exposure was also identified. Similar hazards were found for the future Site worker (HI = 30 for arsenic exposure in Area B + C) and construction worker (HI = 30 for surface soil exposure in Area B + C). Elevated HIs were also found for arsenic in groundwater (i.e., 50 for the future adult residents).

At the Captain's Cove property, the non-cancer hazards were also elevated for the future construction worker (i.e, HI = 91 for manganese and HI of 12 for arsenic in Area A and HI of 900 for manganese in Area G). Similar hazards were identified for the future child and adult resident.

Lead

Lead was identified as a contaminant of concern at the Li Tungsten and Captain's Cove properties. At Li Tungsten, lead in soil ranged from 30 to 3,710 mg/kg in Area B and 4 to 19,600 mg/kg in Area B + C. A similar pattern was found in Area C with lead concentrations ranging from 8.3 to 5,140 mg/kg. These levels were significantly above the background concentration of 3.9 to 103 mg/kg. The levels in groundwater also exceeded the current EPA Action Level.

At Captain's Cove, lead in soil ranged from 95.1 to 512 mg/kg. In Area G, the maximum lead concentration was 3,000 mg/kg.

Radiological Risk

Radionuclide analyses of soil samples showed that thorium and uranium series radionuclides are present in all areas at concentrations that exceed the range of normal background. For several populations evaluated, including both residential and commercial scenarios, the total excess lifetime cancer risk estimates due to exposure to these radioactive contaminants for all four areas evaluated exceed the cancer risk range of 10^{-4} to 10^{-5} . For example, a Site worker's exposure to radionuclides in Area B + C in a commercial future-use scenario would result in an unacceptable cancer risk of 1.4×10^{-2} (or a risk of approximately 14 in 1,000). Similarly, an adult resident living in Area B + C would result in an excess cancer risk from exposure to radionuclides of 1.9×10^{-3} (or a risk of approximately 19 in 10,000). As reflected in the risk calculations, the soil most highly contaminated with radionuclides was found in Area B + C.

Radionuclides in sediments and groundwater were found at very low levels and would not pose an unacceptable risk.

Ecological Risk Assessment

The purpose of the ecological risk assessment was to evaluate environmental samples for Site-related contaminants and to estimate any potential risks that these contaminants may pose to the environment. The ecological assessment included a risk characterization of chemical contaminants in ponded water/wetlands and sediments and surface soil for aquatic, semi-aquatic and terrestrial receptors. Also, a separate risk characterization for radionuclides occurring in surface water, sediment and surface

soil, for aquatic, semi-aquatic and terrestrial receptors was performed.

A four-step process is utilized for assessing Site-related ecological risks for a reasonable maximum exposure scenario:

☐ *Problem Formulation* - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study.

☐ *Exposure Assessment* - a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations.

☐ *Ecological Effects Assessment* - literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors.

☐ *Risk Characterization* - measurement or estimation of both current and future adverse effects.

Wildlife near the Li Tungsten facility may have incidental contact with or ingest contaminants while foraging, nesting, or engaging in other activities in the terrestrial portions of the Site. Chemical contaminants can also adversely affect plants and animals in surrounding habitats via the food chain. Contaminants in ponded water may be taken up by aquatic life as well as semi-aquatic and terrestrial wildlife. Receptor species chosen were considered representative of the local wildlife populations that would use and frequent the Li Tungsten area. The receptors chosen were: aquatic invertebrates, fish, reptiles, and amphibians; mallard; meadow vole; raccoon; herbaceous terrestrial vegetation; American robin; deer mouse; and red fox. Exposure media of ecological concern included surface soils, surface water, and sediment.

The Hazard Quotient (HQ) method was used to characterize risks to receptor species. If an HQ exceeds 1, there is concern for possible adverse effects. The results of the ecological risk characterization indicate that many of the chemicals of concern in ponded water/sediments and soil at the Li Tungsten facility had HQs which exceeded 1, and in some cases ranged up to and beyond 10,000. The highest HQs were exhibited for mallard, raccoon, earthworm, robin, deer mouse and red fox, resulting primarily from inorganics like arsenic, copper, lead, nickel, selenium and zinc.

Captain's Cove Property

Chemical Risk

Chemical analyses of soil samples showed that inorganics, e.g., heavy metals like arsenic, manganese, and antimony, and PCBs are present in Areas A and G at concentrations that pose an unacceptable human health risk. For primarily the residential and construction worker scenarios, the hazard indices and total excess lifetime cancer risk estimates due to exposure to these contaminants exceed the cancer risk range of 10^{-4} to 10^{-6} and the Hazard Index of 1 used in evaluating Superfund sites. For example, an adult resident's exposure to the chemicals of concern in Area A in a residential future-use scenario would result in an unacceptable cancer risk of 9×10^{-3} (or a risk of approximately 9 in 1,000). Similarly, the same adult resident in Area G would be exposed to chemicals resulting in a cancer risk of 1.0×10^{-2} (or a risk of approximately 1 in 1,000). Construction workers in Areas A and G would be exposed to chemicals that contribute to hazard indices of 100 and 900, respectively.

Potential exposure to surface water and sediment on the Captain's Cove property does not result in unacceptable hazard indices or in cancer risks which exceed the risk range. Hypothetical exposures to groundwater underlying the property, although unlikely because of the high level of dissolved solids in the aquifer from saltwater intrusion as well as the availability of the City public water supply, would result in unacceptable hazard indices to residential occupants and commercial Site workers, and unacceptable cancer risks to residents, with arsenic as the predominant contributor to risk.

Radiological Risk

Radionuclide analyses of soil samples showed that thorium and uranium series radionuclides present at Area A and Area G are at concentrations which exceed the range of normal background. For several populations evaluated, including both residential and commercial scenarios, the total excess lifetime cancer risk estimates due to exposure to these radioactive contaminants exceed the cancer risk range of 10^{-4} to 10^{-6} .

As reflected in the risk calculations, the soils in both Areas A and G pose a similar degree of unacceptable cancer risk to future Site workers. The cancer risk in Area A was calculated to be 2.5×10^{-4} (or a risk of approximately 25 in 100,000), while the cancer risk in Area G was calculated to be 1.1×10^{-4} (or a risk of approximately 11 in 100,000), predominantly from external gamma radiation. Further, a future adult resident living in Area A would be exposed to an excess cancer risk from exposure to radionuclides

of 3.8×10^{-2} (or a risk of approximately 38 in 1,000); in Area G, the same resident would be exposed to a risk of 3×10^{-2} (or a risk of approximately 3 in 100). Radionuclides in sediments and groundwater were found not to pose unacceptable risk.

Discussion of Uncertainties in Risk Assessment

The procedure and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and,
- toxicological data.

Uncertainty in environmental sampling arises, in part, from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the contaminants of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the contaminants of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the baseline human health risk assessment provides upper-bound estimates of the risks to populations near the Site, and it is highly unlikely to underestimate actual risks related to the Site.

Specifically, several aspects of risk estimation contribute uncertainty to the projected risks. EPA recommends that the arithmetic average concentration of the data be used for evaluating long-term exposure and that, because of the uncertainty associated with estimating the true average concentration at a site, the 95% upper confidence limit (UCL) on the arithmetic average be used as the exposure point concentration. The 95% UCL provides reasonable confidence that the true average will not be underestimated. Exposure point concentrations were calculated from soil sample data sets to represent the reasonable maximum exposure (RME) to various current and hypothetical future populations on and around the Li Tungsten and Captain's Cove properties. Many of the soil sample locations were biased, i.e., they were selected due to the presence of elevated levels of contamination. Therefore, the UCL values calculated on those data sets are a conservative estimate of the RME. In fact, the true UCL values on the actual distributions of chemicals of concern in soil are less than the values calculated from the analytical data. Uncertainty associated with sample laboratory analysis and data evaluation is considered low as a result of a rigorous quality assurance program which included data validation of each sample result.

In addition to the calculation of exposure point concentrations, several site-specific assumptions regarding future land use scenarios, intake parameters, and exposure pathways are a part of the exposure assessment stage of a baseline risk assessment. Assumptions were based on site-specific conditions to the greatest degree possible, and default parameter values found in EPA risk assessment guidance documents were used in the absence of site-specific data. However, there remains some uncertainty in the prediction of future use scenarios and their associated intake parameters and exposure pathways. The exposure pathways selected for current scenarios were based on the site conceptual model and related RI and FFS data. The uncertainty associated with the selected pathways for these scenarios is low because site conditions support the conceptual model.

Standard dose conversion factors, risk slope factors, and reference doses are used to estimate the carcinogenic and noncarcinogenic hazards associated with site contaminants. The risk estimators used in this assessment are generally accepted by the scientific community as representing reasonable projections of the hazards associated with exposure to the various chemicals of potential concern.

Human epidemiological data on carcinogenesis from exposure to ionizing radiation are more extensive than that for most chemical carcinogens. However, these data are based primarily upon studies of populations exposed to radiation doses and dose rates that are higher than the levels of concern at the Li Tungsten/Captain's Cove

site. Use of these data to predict excess cancer risk from low-level radiation exposure requires extrapolation based upon somewhat uncertain dose-response assumptions.

Results calculated from using the RESRAD computer model were used to present the cancer risks for the radiological portion of the Li Tungsten and Captain's Cove risk assessments.

Radiological risk calculations were performed using both the RESRAD/RESRAD-BASELINE computer models, developed by Argonne National Lab, and EPA's RAGS methodology for calculating the carcinogenic risk due to exposure to radioactive materials. Whenever possible, parameter values used by RESRAD were set equal to default values incorporated in the RAGS methodology. The largest pathway discrepancy between the two methodologies was the risk from produce ingestion, with the RESRAD risk exceeding the RAGS risk by an order of magnitude in some cases. Overall, the results of both analyses were compared and found to be extremely consistent.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the EPA's baseline human health risk assessment report for OU 1, contained in Volume I of the RI Report, and OU 2, contained in Volume II of the FS report.

Based on the results of the baseline risk assessment, EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), NYSDEC's recommended soil cleanup objectives, Site-specific risk-based levels, and the most reasonably anticipated future land use for the Site, i.e., commercial development. The RAOs which were developed for soil, sediment, and groundwater are designed, in part, to mitigate the health threat posed by ingestion, dermal contact, or inhalation of particulates where these soils are contacted or disturbed. The RAOs are also intended to mitigate the health threat posed by the ingestion of groundwater and are designed to prevent further leaching of contaminants from the soil to the groundwater.

The following remedial action objectives were established for the Site:

Building Materials

- Prevent exposure to building materials contaminated with radionuclides or chemicals of concern.
- Eliminate hazards to future Site workers posed by unstable structures.
- Remove any structural impediments that might interfere with pre-design sampling and implementation of soil and groundwater remediation.

Soil/Sediment

- Prevent or minimize exposure to contaminants of concern through inhalation, direct contact or ingestion.
- Prevent or minimize cross-media impacts from contaminants of concern in soil/sediments migrating into underlying groundwater (note that contamination of Glen Cove Creek's sediments has been addressed as part of the Mattiace Record of Decision for OU 1, and is therefore not included in the remedial objectives of this Plan).

Groundwater/Ponded Water

- Prevent or minimize ingestion, dermal contact and inhalation of inorganic-contaminated groundwater "hot spot" areas on lower Parcel C and on Parcel A that are above State and Federal MCLs (Note: organic contamination of groundwater from the Crown Dykman State Superfund Site will be addressed by the NYSDEC and is therefore not included in the remedial objectives of this Plan).
- Restoration of groundwater quality to levels which meet State and Federal standards.
- Remediation of contaminated surface water in on-Site ponds to reduce risks to public health and the environment.

In order to meet these objectives, preliminary remedial goals, or PRGs, were developed during the FS for various contaminants of concern. In developing the final soil cleanup numbers presented below, consideration was given to risks posed by the contaminants under reasonably anticipated future uses of the Site, consistency with cleanup levels developed for the State Superfund cleanup at Captain's Cove, and the New York State TAGMs. Site-wide cleanup

levels developed for metals and radionuclides are presented in **Table 15**; these contaminants are intended to be indicators for other co-located metals contaminants. Due to the spatial and vertical location of contaminants of concern, EPA believes that if the contaminated soils are remediated to the cleanup levels presented in **Table 15** for the indicator contaminants, then the remaining inorganic contaminants in soils will also be adequately addressed. In addition, total PCBs were found in significant concentrations only in the dumping area of Parcel B at the Li Tungsten facility; therefore, cleanup levels for PCBs in that area will be 1 mg/kg in the top two feet and 10 mg/kg below two feet, based on TAGMs. Cleanup levels for contaminated sediments will include arsenic at 6 mg/kg and lead at 31 mg/kg, based on New York State Sediment Criteria.

Groundwater cleanup levels for arsenic and radium are State and Federal MCLs, i.e., arsenic = 0.05 µg/l and $^{226}\text{Ra} + ^{228}\text{Ra} = 5 \text{ pCi/l}$.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The Proposed Plan evaluates, in detail, both soil and groundwater alternatives for the Li Tungsten Site. The soil alternatives address both contaminated soil and sediments. Soil alternatives evaluated in the Plan for the Captain's Cove property address the two areas of ore residuals disposal, since the other areas of this property with only nonradioactive contamination have been addressed under NYSDEC's March 1999 ROD. Similarly, alternatives for groundwater remediation were not evaluated for the Captain's Cove property because radionuclides slightly exceeded remediation goals in only one of eleven wells. The soil and groundwater alternatives for the Site are presented below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and not the time required to design the remedy, negotiate its performance by the parties responsible for the contamination, or procure contracts for design and construction.

Because of the lengthy half-lives of the radionuclides of concern, e.g., both U^{238} and Th^{232} have half-lives exceeding one billion years, as well as Long Island's sole source aquifer designation,

alternatives that would not permanently remove wastes containing the thorium and the uranium series radionuclides from the Site to protect future generations were considered not protective, nor were they felt to meet the criteria included in the Nuclear Regulatory Commission regulations in 10 CFR 40 regarding the siting of permanent radioactive waste disposal areas. Similarly, the consolidation and on-Site containment of radioactive wastes would not comply with the Long Island Landfill Law (NYS Environmental Conservation Law 27-0704), 6 NYCRR Part 380 etc. Thus, in developing the alternatives for soil remediation, on-Site containment of radioactive wastes was not included as an alternative.

Soil Remediation Alternatives - Li Tungsten Facility

Alternative LS - 1: No Action

Capital Cost:	\$0
Annual Operation and Maintenance (O&M) Cost:	N/A
Construction Time:	N/A
30-Year Present Worth:	N/A

The Superfund program requires that the "No-Action" Alternative be considered as a baseline for comparison with the other alternatives. The No-Action Alternative includes no remedial measures to address the contamination at the Site.

The No-Action Alternative would include the development and implementation of a public awareness and education program for the residents in the area surrounding the Site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions existing at the Site.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA would require that the Site be reviewed every five years.

Alternative LS - 2: Excavation and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils

Capital Cost:	\$16,754,000
Annual O&M Cost:	\$0
Construction Time:	5 months
30-Year Present Worth:	N/A

Under this alternative, approximately 27,000 cubic yards (cy) of soil, sediment, and ore and other metals-processing residuals (including those radioactive ore residuals presently staged in the

Dickson Warehouse) would be addressed: Soils, sediments, and ore and other metals-processing residuals contaminated above cleanup levels would be excavated in the various contaminated areas of the Li Tungsten facility. Radioactive wastes would require excavation to an average depth of four feet (maximum depth of four to six feet on Parcel C). Heavy metals-contaminated soils, while typically collocated with the radioactive materials, would require excavation to depths greater than four feet in several areas, because of a greater propensity of these metals to leach from the ore and other metals-processing residuals into the groundwater. Excavations to depths as much as ten feet would be required in a few areas of Parcel C in order to achieve the soil cleanup levels listed earlier under **REMEDIAL ACTION OBJECTIVES**.

Radioactive wastes would be disposed of at an off-Site disposal facility licensed to manage this type of material. Any nonradioactive, inorganic-contaminated wastes would be disposed of at an appropriate off-site landfill. If necessary, these excavated wastes would be chemically stabilized at the disposal facility to achieve compliance with the land ban requirements of the Federal Resource Conservation and Recovery Act (RCRA), due to the presence of inorganic contamination.

The existing storm sewers would be pressure-washed and the washwater and sediments collected for off-Site disposal.

Additionally, several structures would be demolished to eliminate hazards posed by structural instability and hazardous construction materials (*i.e.*, asbestos), or in order to facilitate pre-design sampling and removal of radioactive and chemical wastes. This action would include, at a minimum, demolition of the Dickson Warehouse on Parcel C and the Carbide Building and Lab and Wire Building on Parcel A.

EPA would also recommend that deed restrictions be placed on the Li Tungsten facility property to prevent the property from being used for residential purposes, and to discourage the installation of potable water wells. Five-year reviews would be required as this alternative does not allow for unrestricted future use of the property.

Alternative 1S - 3: Excavation with Radioactive Waste Volume Reduction, Off-Site Radioactive Waste Disposal and Stabilization and On-Site Containment of Other Nonradioactive Metals-Contaminated Soils

Capital Cost:	\$12,579,000
Annual O&M Cost:	\$60,000
Construction Time:	13 months
30-Year Present Worth:	\$14,379,000

This alternative is different from Alternative LS-2 in that a radioactive materials separation technology or strategy would be used to reduce the volume of radioactive wastes after excavation in order to reduce the costs of off-Site disposal. Nonradioactive soils contaminated with inorganics would be stabilized and contained on-Site.

Excavated soils, sediments, and ore and other metals-processing residuals would be addressed via a volume reduction technology or strategy, e.g., the Segmented Gate System, or SGS; the Automated Conveyor Monitoring System; or precision excavation techniques specifically applicable to excavation of radioactive materials. The concentrated radioactive wastes would be disposed of at an off-Site disposal facility licensed to manage this type of material. Some or all of the remaining nonradioactive materials are expected to contain other hazardous substances such as heavy metals. The remaining material would be disposed of on-Site in a prepared cell after chemical fixation. The cell would likely be located in the middle of Parcel B of the Li Tungsten facility. The success of these efforts is dependent on the effectiveness of soil separation testing which would be conducted during the remedial design. For costing purposes, the volume reduction efficiency was considered to be 50 percent.

Alternative LS - 4: Excavation with Radioactive Waste Volume Reduction, Off-Site Radioactive Waste Disposal, and Off-Site Disposal of Other Nonradioactive Metals-Contaminated Soils

Capital Cost:	\$14,445,000
Annual O&M Cost:	\$0
Construction Time:	9 months
30-Year Present Worth:	N/A

This alternative is the same as Alternative LS-3, except that after utilization of a radioactive materials separation technology or strategy, any nonradioactive but metals-contaminated waste soils would be shipped off-Site for disposal instead of being contained on-Site. These wastes would be disposed of at an off-Site Subtitle D facility, unless they were determined to be hazardous pursuant to RCRA in which case they would be disposed of at an off-Site RCRA Subtitle C facility.

Soil Remediation Alternatives - Captain's Cove Property

Alternative CS - 1: No Action

Capital Cost:	\$0
Annual O&M Cost:	N/A
Construction Time:	N/A
30-Year Present Worth:	N/A

The Superfund program requires that the "No-Action" Alternative be considered as a baseline for comparison with the other alternatives. The No-Action Alternative does not include any remedial measures that address the problem of contamination at the Site.

The No-Action Alternative would include the development and implementation of a public awareness and education program for the residents in the area surrounding the Site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions existing at the Site.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA would require that the Site be reviewed every five years.

Alternative CS - 2: Excavation and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils

Capital Cost:	\$15,465,000
Annual O&M Cost:	\$0
Construction Time:	3 months
30-Year Present Worth:	N/A

This alternative is similar to Alternative LS-2 for the Li Tungsten facility. Approximately 31,000 cubic yards of soil, sediment, and ore and other metals-processing residuals contaminated above radioactive cleanup levels would be excavated in Areas A and G of the Captain's Cove property.

Radioactive wastes would be disposed of at an off-Site disposal facility licensed to manage this type of material. Any nonradioactive, heavy metals-contaminated soils would be disposed of at an appropriate off-Site landfill. If necessary, excavated waste would be chemically fixated at the disposal facility to achieve land ban compliance, due to the presence of inorganic contamination.

EPA would also recommend that deed restrictions be placed on the Captain's Cove property both to prevent it from being used for residential purposes and to discourage the installation of potable water wells. Five-year reviews would be required as this alternative does not allow for unrestricted future use of the property.

Alternative CS - 3: Excavation with Radioactive Waste Volume Reduction, Off-Site Radioactive Waste Disposal, and Stabilization

and On-Site Containment of Other Nonradioactive Metals-Contaminated Soils at the Li Tungsten Facility

Capital Cost:	\$10,432,000
Annual O&M Cost:	\$60,000
Construction Time:	11 months
30-Year Present Worth:	\$11,787,000

This alternative is different from Alternative CS-2 in that a radioactive materials separation technology or strategy would be used to further reduce the volume of radioactive wastes after excavation in order to reduce the costs of off-Site disposal, and on-Site stabilization and containment would be utilized for disposal of nonradioactive, but metals-contaminated wastes.

Excavated soils and ore and other metals-processing residuals would be addressed via a volume reduction technology or strategy. The concentrated radioactive wastes would be disposed of at an off-Site disposal facility licensed to manage this type of material. Some or all of the remaining nonradioactive material is anticipated to contain other hazardous substances, such as heavy metals. The remaining material would be disposed of on-Site in a prepared cell after chemical fixation. The cell would likely be located in the middle of Parcel B of the Li Tungsten facility. The success of these efforts is dependent on the effectiveness of soil separation testing which would be conducted during the remedial design. For costing purposes, the volume reduction efficiency was considered to be 50 percent.

Alternative CS - 4: Excavation with Radioactive Waste Volume Reduction, Off-Site Radioactive Waste Disposal, and Off-Site Disposal of Other Nonradioactive Metals-Contaminated Soils

Capital Cost:	\$13,597,000
Annual O&M Cost:	\$0
Construction Time:	7 months
30-Year Present Worth:	N/A

This alternative is the same as Alternative CS-3, except that after utilization of a radioactive materials separation technology or strategy, any nonradioactive but metals-contaminated wastes would be shipped off-Site for disposal instead of being contained on-Site. These wastes would be disposed of at an off-Site Subtitle D facility, unless they were determined to be hazardous pursuant to RCRA, in which case they would be disposed of at an off-Site RCRA Subtitle C facility.

Groundwater Remediation Alternatives**Alternative LW - 1: No Action**

Capital Cost:	\$0
Annual O&M Cost:	\$32,000
Construction Time:	N/A
30-Year Present Worth:	\$722,000

The Superfund program requires that the "No-Action" Alternative be considered as a baseline for comparison with the other alternatives. The No-Action Alternative does not include any remedial measures that address the contamination at the Site.

This alternative would serve as a groundwater monitoring mechanism for the Li Tungsten Site. A long-term sampling program would be developed to monitor groundwater quality. New monitoring wells would also be added to the existing monitoring well networks to increase the network's coverage in areas of known contamination.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA would require that the Site be reviewed every five years.

Alternative LW - 2: Interceptor Trench/Extraction Wells with On-Site Treatment and Disposal

Capital Cost:	\$351,000
Annual O&M Cost:	\$84,000
Construction Time:	6 months
30-Year Present Worth:	\$2,247,000

This alternative uses a combination of an interceptor trench and low-flow extraction wells to capture groundwater contaminated with heavy metals for on-Site treatment consisting of chemical precipitation/settling and on-Site reinjection to groundwater. To capture shallow inorganic contaminated groundwater (less than 20 feet bgl), an interceptor trench would be installed on the lower portion of Parcel C. The trench would measure approximately 350 feet long. Multi-tiered horizontal high density polyethylene perforated piping would be installed perpendicularly to the groundwater flow direction. Low-flow extraction wells would also be installed in inorganic "hot spot" areas to capture isolated pockets of groundwater contamination. Contaminated groundwater from the interceptor trench and wells would be collected and channeled via gravity flow to collection sump areas. Contaminated groundwater at the sump areas would be pumped at approximately 10 gallons per minute to an on-Site treatment facility where it would be treated to State and Federal MCLs and groundwater standards through chemical precipitation, clarification, and pH adjustment.

The treated groundwater would then be conveyed to up gradient on-Site reinjection galleries.

A long-term sampling program would be developed to monitor groundwater quality. New monitoring wells would be added to the existing monitoring well network to increase its area of coverage.

Alternative LW - 3: Interceptor Trench/Extraction Wells with Off-Site Treatment and ReInjection at the Nearby Mattiace Superfund Site Treatment Facility

Capital Cost:	\$208,000
Annual O&M Cost:	\$47,000
Construction Time:	6 months
30-Year Present Worth:	\$1,269,000

This alternative is similar to Alternative LW-2 in that it would use an interceptor trench and low-flow extraction wells to capture contaminated groundwater. Instead of on-Site treatment, however, the contaminated groundwater would be conveyed via an underground pumping station and force main from the Li Tungsten facility to the Mattiace Site's groundwater treatment plant. The flow from the Li Tungsten facility (estimated at approximately 10 gallons per minute), when combined with flow from the Mattiace extraction wells, would be approximately 20 gallons per minute. Treatment would consist of chemical precipitation, clarification, and pH adjustment. Some modifications to the existing Mattiace plant and/or operating procedures might be necessary to accept the waste stream from the Li Tungsten facility. For example, because the Li Tungsten waste influent is predominantly heavy metals, an additional metals clarifier might have to be added. Chemical feed rates for metals treatment would also change and the amount of sludge generated by the facility would increase, requiring more frequent sludge hauling.

A long-term sampling program would be developed to monitor groundwater quality. New monitoring wells would be added to the existing monitoring well network to increase its area of coverage.

Alternative LW - 4: Reactive Walls with Slurry Walls and In-Well Adsorption Treatment

Capital Cost:	\$644,000
Annual O&M Cost:	\$29,000
Construction Time:	7 months
30-Year Present Worth:	\$1,299,000

This alternative consists of the installation of a reactive wall on lower Parcel C, directly down gradient of the existing inorganic contamination. The reactive wall would be installed below-ground to a depth of approximately 30 feet bgl. It would be designed as a funnel and gate system and would consist of a passive permeable barrier through which groundwater would pass. The funnel, consisting of a soil-bentonite slurry wall, would be designed to channel contaminated groundwater toward the treatment gates, which would contain adsorption media to capture the inorganic contamination. Collection galleries consisting of pea gravel would be installed adjacent to the wall. Treated groundwater would then flow to a distribution trench, located immediately down gradient of the slurry wall.

"Hot spot" inorganic contamination areas would be treated via in-well adsorption using media that selectively adsorbs dissolved heavy metals. The media would be periodically retrieved and disposed of while new media was reinserted for additional cycles of adsorption.

A long-term sampling program would be developed to monitor groundwater quality. New monitoring wells would be added to the existing monitoring well network to increase the network's area of coverage.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria. These nine criteria are as follows: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements; long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; cost; and State and community acceptance. The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and requirements, or provide grounds for invoking a waiver.

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. This criteria also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.
- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- Cost includes estimated capital and operation and maintenance (O&M) costs, and net present worth costs.
- State acceptance indicates whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred remedy.
- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

Comparative Analysis of Soil Remedial Alternatives

Overall Protection of Human Health and the Environment

Alternatives LS-1 and CS-1, the No-Action Alternatives, would not protect human health or the environment beyond discouraging entry to the presently fenced Site.

All remaining soil alternatives would protect human health and the environment by reducing the existing exposures to radiological and chemical Site contaminants to below soil/sediment cleanup levels. Alternatives LS-2 and CS-2 and Alternatives LS-4 and CS-4 would achieve protection of human health and the environment by removing the contaminated soils, sediments, and ore and other metals-processing residues above cleanup levels for off-Site treatment and disposal. Alternatives LS-3 and CS-3 would achieve similar protection vis-a-vis the radionuclides of concern by removing them off-Site. These alternatives would achieve protectiveness from the heavy metal contaminants by stabilizing and containing them on-

Site, thereby reducing or eliminating the various exposure pathways and potential for cross-media impacts to groundwater that presently exist.

Compliance with ARARs

Alternatives LS-2 and CS-2, and LS-4 and CS-4 may have to comply with land disposal restrictions (or LDR, codified at 40 C.F.R. § 268) for the off-Site disposal of any excavated wastes contaminated with certain heavy metals above LDR levels. This ARAR also describes minimum technology requirements needed to construct the on-Site cell in Alternative LS-3 and CS-3. The construction of the containment cell in Alternative LS-3 and CS-3 would be subject to 6 NYCRR Parts 360 and 364 which outline requirements of solid and hazardous waste management facilities and transporters for managing radioactive and hazardous materials. Off-Site transportation of radioactive materials under Alternatives LS-2 and CS-2, LS-3 and CS-3, and LS-4 and CS-4 which exceed a concentration of 2,000 pCi/g would be regulated by 49 C.F.R. § 173. Since Alternatives LS-2 and CS-2, LS-3 and CS-3, and LS-4 and CS-4 would involve the excavation of some PCB-contaminated soils, disposition of the PCB waste would be governed by the requirements of the Federal Toxic Substances Control Act (TSCA).

During excavation activities, the radionuclide emissions standards of 40 C.F.R. § 61 which limits exposures to the maximally exposed member of the public to 10 mrem/year must be met.

For a complete listing of ARARs, see Tables 2-6, 2-7 and 2-8 of the Li Tungsten FS, Volume 1.

Long-Term Effectiveness and Permanence

Alternatives LS-1 and CS-1 would not provide any long-term effectiveness or permanence in protecting human health and the environment.

All of the other soil alternatives would permanently protect public health and the environment over the long term because the radioactive wastes would be excavated and removed to an off-Site facility licensed to manage this type of material. Implementation of Alternatives LS-2 and CS-2 and Alternatives LS-4 and CS-4 would ensure permanent protection of public health and the environment at the Site over the long term because the nonradioactive, metals-contaminated soils at the Site would be removed to an off-Site disposal location designed for long-term containment. Alternatives LS-3 and CS-3 would provide for long-term effectiveness and permanence through a properly designed on-Site containment cell which in turn would require institutional controls and extended

maintenance to provide long-term protection to public health and the environment.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives LS-1 and CS-1 would not reduce the toxicity, mobility, or volume of any contaminants at the Site. Alternatives LS-2 and CS-2 and Alternatives LS-4 and CS-4 would reduce the toxicity, mobility, and volume of contaminants at the Site through excavation and off-Site disposal of the radioactive and metals-contaminated wastes. Alternatives LS-3 and CS-3 would reduce the toxicity, mobility, and volume of the radiological contaminants in the same manner. Alternatives LS-3 and CS-3 would reduce the toxicity and mobility of the heavy metals-contaminated soils that would be contained on-Site by chemically fixating the metals to prevent them from leaching. Alternatives LS-3 and CS-3 and Alternatives LS-4 and CS-4 may reduce the volume of the radioactive materials through the use of a separation technology; however, the percent volume reduction is uncertain and would be the result of a physical separation process rather than a result of treatment.

Short-Term Effectiveness

The No-Action Alternatives LS-1 and CS-1 would not result in any adverse short-term impacts. Potential short-term impacts would be associated with Alternatives LS-2 and CS-2, LS-3 and CS-3, and LS-4 and CS-4 due to the direct contact with soil by workers and through the potential for generation of dust during construction. Such impacts would be minimized through worker health and safety protective measures and dust suppression techniques such as covering waste piles and water spraying during dust-generating activities. Monitoring the excavation and soil handling areas to determine emission levels will also ensure that off-Site receptors were not being significantly impacted. Alternatives LS-3 and CS-3 and Alternatives LS-4 and CS-4 would involve additional handling during on-Site radioactive materials separation, and Alternatives LS-3 and CS-3 would also result in increased handling of materials during stabilization of the metals-contaminated wastes and their disposition in the on-Site cell. The vehicular traffic associated with all Alternatives other than No Action could impact the local roadway system and nearby residents through increased noise level and traffic flow.

Proper protective equipment, air monitoring during excavation and soil handling, and appropriate soil handling procedures would minimize the short-term risks to workers and the surrounding community for all the alternatives, other than the No Action Alternatives.

Implementability

The implementability of Alternatives LS-2 and CS-2, LS-3 and CS-3, and LS-4 and CS-4 would likely be a function of the acceptability of transportation of low-level radioactive wastes to an off-Site disposal location. These wastes would be securely loaded and trucked to an appropriate rail spur, where the wastes would then be shipped by rail to their ultimate disposal location. The implementability of Alternatives LS-3 and CS-3 and Alternatives LS-4 and CS-4 would also depend on the efficiency of the separation technology or strategy selected for separation of radionuclide-contaminated soil from other excavated soils. The implementability of Alternatives LS-3 and CS-3, in which heavy metals-contaminated soil would be left on-Site in a containment cell above health-based levels, would depend on receiving State approval and local acceptance. Institutional controls through deed restrictions on the future residential development of the Li Tungsten facility and Captain's Cove property should be readily implementable for all the Alternatives.

Cost

Table 16 provides the capital costs, operation and maintenance costs, and present worth costs associated with each of the combined Soil Alternatives. Present worth costs were calculated over a 30 year period using 1999 as the base year, 5% as the discount rate, and 3% as the rate of inflation. The three sets of Soil Alternatives other than the No Action Alternative are relatively similar in their present worth estimates. Capital cost outlays would be significantly less expensive, though, for LS-3/CS-3 than for LS-2/CS-2 or LS-4/CS-4.

State Acceptance

NYSDEC concurs with the selected remedy, **Excavation with Radioactive Waste Volume Reduction, and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils (LS-4/CS-4)**, and **No Action with continued groundwater monitoring (LW-1)**. A letter of concurrence is attached as **Appendix IV**.

Community Acceptance

Community acceptance of the selected remedy for soil was assessed during the public comment period. Comments were expressed at the public meeting and written comments were received during the public comment period. While the public seemed generally supportive of the remedy at the public meeting, over 700 identical (form) letters were received asking EPA, to change the proposed alternatives for soil remediation from Alternatives LS-4 and CS-4 (which include soil separation to reduce the volume of radiologically-contaminated

soil) to Alternatives LS-2 and CS-2 (which do not include volume reduction). The letters also requested that EPA take adequate preventive measures to control fugitive dust, establish radioactive air monitoring stations during cleanup activities and conduct further risk assessment analyses. Specific responses to public comments are addressed in the Responsiveness Summary, which is attached as Appendix V.

Comparative Analysis of Groundwater Remedial Alternatives

Overall Protection of Human Health and the Environment

The remedial action objective of the Groundwater Alternatives is to eventually restore groundwater quality in order to meet State and Federal MCLs. However, even without deed restrictions or other institutional controls, the human health impacts from potable water consumption that were calculated in the risk assessment represent a hypothetical risk. The likelihood of drawing potable water from the Upper Glacial Aquifer is very remote because of the high level of dissolved solids in the aquifer from saltwater intrusion from Glen Cove Creek and Hempstead Harbor, as well as the ready availability of the City public water supply. Alternative LW-1, the No-Action Alternative, would not in itself provide any protection of human health and the environment as no active remedial measures or institutional controls are included in this alternative. However, remediation of contaminated soil should greatly decrease the degree of leaching of contaminants from the soil into the groundwater, which in turn would significantly reduce the magnitude and duration of any hypothetical future impacts on human health and the environment from groundwater. Alternatives LW-2, LW-3, and LW-4 would directly provide protection of human health and the environment because the groundwater contaminated with inorganics at the Li Tungsten facility would be gradually intercepted and prevented from discharging to Glen Cove Creek.

Compliance with ARARs

Alternative LW-1 would not actively address the concentrations of arsenic, antimony, and other heavy metals in groundwater that are presently in excess of MCLs promulgated under the Federal Safe Drinking Water Act (40 C.F.R. § 141), the New York State MCLs (10 NYCRR Part 5), or New York State Water Quality Standards (6 NYCRR Part 703). However, it is anticipated that soils remediation could result in MCLs being achieved in the near future by removing the source of groundwater contamination.

Alternatives LW-2, LW-3, and LW-4 all use treatment technologies capable of removing the inorganics of concern to meet the standards.

Off-Site disposal of any sludges or treatment residues generated as a result of groundwater treatment processes included as part of Alternatives LW-2, LW-3, and LW-4 would be required to be sent to an appropriate off-Site treatment/disposal facility.

Long-Term Effectiveness and Permanence

Removal of the source of groundwater contamination under any of the soil alternatives would improve the long-term effectiveness and permanence of all of the groundwater alternatives.

Contaminants would not be actively removed under Alternative LW-1 except by the natural movement of groundwater. The natural movement of groundwater would dilute the remaining contaminated levels and eventually flush the inorganics into Glen Cove Creek, where they would continue to be dispersed. Given the relatively sporadic inorganic contamination that currently exists in the Upper Glacial Aquifer, it is anticipated that this mechanism when combined with the soil remediation would provide long-term effectiveness in meeting groundwater standards. The monitoring program would be designed to determine if LW-1 is effective.

Alternatives LW-2, LW-3, and LW-4 would all be similarly effective over the long term in permanently removing inorganic contaminants from groundwater.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative LW-1 would not reduce the toxicity, mobility, or volume of contaminated groundwater through treatment. Using different technologies, Alternatives LW-2 and LW-3 would reduce the toxicity, mobility, and volume of contaminated groundwater through chemical precipitation of heavy metals, clarification, and pH adjustment. Alternative LW-4 would rely on an adsorptive treatment media to adsorb dissolved heavy metals for subsequent off-Site disposal.

Short-Term Effectiveness

Alternative LW-1 would not include any remediation and therefore would not pose any short-term impacts to the community or to workers.

Alternatives LW-2, LW-3, and LW-4 would all require trenching in the vicinity of Garvies Point Road and Herhill Road to accommodate the installation of different subsurface features (i.e., wells, drains, force main, and slurry wall). Potential short-term impacts would be associated with the direct contact with soil by workers and the potential for generation of dust during construction. Such impacts would be minimized through worker health and safety protective measures and dust suppression techniques such as

covering waste piles and water spraying during dust-generating activities.

Alternative LW-3 would have the most impact on the local community as it would require that a forcemain be installed below grade for approximately 700 feet from the groundwater collection point to the treatment facility at the Mattiace Site.

Potential short-term impacts would be associated with the three treatment alternatives as a result of the direct contact of groundwater by workers. However, impacts would be minimized through worker health and safety protective measures.

Implementability

All of the alternatives are considered technically and administratively implementable. Alternatives LW-2, LW-3, and LW-4 all would be able to achieve MCLs in the treated effluent with the proposed treatment methods, although the reliance of LW-2 and LW-3 on standard proven technology improves their degree of implementability. Off-Site property easements or construction permits should also be relatively easy to obtain for all three action alternatives.

Cost

Table 17 provides the capital costs, operation and maintenance costs, and present worth costs associated with each of the groundwater alternatives. Present worth costs were calculated over a 30 year period using 1999 as the base year, 5% as the discount rate, and 3% as the rate of inflation. LW-4 has the highest capital cost outlay, being three times as expensive as the least expensive action alternative, LW-3. LW-2 has the highest present worth costs, due to the relatively high maintenance costs of operating a treatment facility. LW-1 predictably costs the least in a present worth analysis, because the only costs associated with this alternative are for the long-term monitoring program.

State Acceptance

As mentioned above, NYSDEC concurs with the selected remedy, **Excavation with Radioactive Waste Volume Reduction, and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils (LS-4/CS-4), and No Action with Continued Groundwater Monitoring (LW-1)**. A letter of concurrence is attached as Appendix IV.

Community Acceptance

Community acceptance of the selected remedy for groundwater was assessed during the public comment period. EPA believes that the community generally supports this approach. Specific responses to public comments are addressed in the Responsiveness Summary, which is attached as **Appendix V**.

SELECTED REMEDY

Soils, Sediments, and Debris

Based upon an evaluation of the various alternatives and consideration of community acceptance, EPA and NYSDEC have selected **Alternative LS-4 and CS-4: Excavation with Radioactive Waste Volume Reduction, and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils** for the contaminated soils, sediments, and debris at the Li Tungsten facility and the Captain's Cove property. The selected remedy at both Li Tungsten and Captain's Cove will include excavation, volume reduction, and off-Site disposal of all radioactive/chemical wastes, consistent with the cleanup levels developed for this Site. The remedial action cleanup levels for these wastes were provided earlier in **Table 15**.

There are multiple areas requiring excavation on all three parcels of the Li Tungsten facility (**Figure 6**) and there are two large areas requiring excavation at Captain's Cove (**Figure 7**). At the Li Tungsten facility, radioactive wastes require excavation to an average depth of four feet (estimated depth of six feet, on Parcel C). Heavy metals-contaminated soils, while typically co-located with the radioactive wastes, will require excavation to depths greater than four feet in several areas, because of the elevated concentrations of heavy metals and the propensity of these metals to leach from the ore and other metals-processing residuals into the subsurface and eventually into the groundwater. Excavations to depths as much as ten feet will be required in a few areas of Parcel C in order to achieve the chemical cleanup levels for these metals-contaminated soils. Excavation is expected to yield an estimated 18,300 cy of radioactive wastes and 17,300 cy of nonradioactive metals-contaminated wastes at the Li Tungsten facility.

At Captain's Cove, where the radioactive wastes were buried deeper, wastes will require excavation to an average depth of eight feet in Area A, and twelve feet in Area G. Excavation is expected to yield an estimated 13,200 cy of radioactive wastes and 20,550 cy of nonradioactive, metals-contaminated wastes at the Captain's Cove property. Excavated Site wastes will be treated through a volume reduction technology or strategy in order to minimize the volume of the radioactive wastes that will require off-Site disposal, at a

disposal facility licensed to manage this type of material. Treatability tests will be required to determine the efficiency of any volume reduction technology employed. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision. Radioactive wastes will be disposed of at an off-Site disposal facility licensed to manage this type of material. Some or all of the remaining non-radioactive wastes are anticipated to contain other contaminants, such as heavy metals. These wastes will be disposed of at an off-Site RCRA Subtitle D facility, unless the toxicity characteristic leaching procedure (TCLP) testing indicates that they are hazardous, in which case they will be disposed of at a RCRA Subtitle C facility. Post-excavation sampling will be required to ensure that soil cleanup levels have been met prior to backfilling the holes. Excavated soils that do not exceed cleanup levels or contain debris could be used as backfill. In addition, a minimum of two feet of clean fill will then be used to complete the backfilling to match the surrounding grade.

The existing storm sewers will also be pressure-washed and the effluent and sediments collected for off-Site disposal.

The selected remedy will also include demolition of several structures at the Li Tungsten facility to eliminate hazards posed by structural instability, hazardous materials of construction (i.e., asbestos), or contamination with radionuclides, as well as to facilitate both pre-design sampling and implementation of future remedial actions. This action will include, at a minimum, demolition of the Dickson Warehouse on Parcel C and the Carbide and Lab and Wire Buildings on Parcel A.

Groundwater and Surface Water

Based upon an evaluation of the various alternatives and consideration of community acceptance, EPA and NYSDEC have selected **Alternative LW-1: No Action** for contaminated groundwater at the Li Tungsten facility.

The preferred alternative at the Li Tungsten facility will require monitoring of the Upper Glacial Aquifer in the vicinity of the Site to determine the effects of the soil remedy on groundwater quality. The preference for no action is based on the sporadic and generally low-level nature of the inorganic contamination; as well as the impacts of saltwater intrusion on the Aquifer and the availability of the City's potable water supply to the affected area, which significantly contribute to the non-use of the contaminated aquifer.

as a potable water source. Nassau County Public Health Ordinance Article 4, which prohibits the installation of new private potable water systems in areas served by a public water supply, should effectively preclude any future potable water well installations in this portion of the aquifer. The excavation of inorganic contamination to the specified cleanup levels will also minimize leaching of the contaminants in the soil to groundwater. As a result, the groundwater beneath the Site is expected to improve after excavation is completed.

As noted above, a groundwater monitoring program will be initiated as part of the selected remedy to monitor the quality of the aquifer beneath the Site. Additional monitoring wells will be added to the existing monitoring well network to increase the network's coverage in areas of known contamination. Monitoring of the sediments and water column of Glen Cove Creek will also continue on an annual basis as part of the Mattiace Superfund long-term response action. The results of both monitoring programs will be integrated to provide a comprehensive analysis of the contaminant profile in groundwater and in the Creek, and to identify any discernible interrelationships or trends. As noted in the discussion on Glen Cove Creek under the Summary of Site Characteristics section, approximately 12,000 cy of sediment were dredged from the mouth of the Creek in 1996; sampling results from monitoring location GC-03, located in this dredged area, indicate significantly lower contaminant levels than previous results for this area. In addition, the planned dredging of the remainder of the Creek this Fall/Winter, which will include dredging of the entire width of the Creek fronting virtually all of Parcel A to a depth of 8 feet, will result in the removal of approximately 35,000 cy of sediment. This sediment removal coupled with EPA and DEC remedial actions planned for the Li Tungsten facility and Captain's Cove, as well as other actions planned or underway for other Federal or State sites, should result in significant improvement in the water quality and sediment quality in the Creek. The year 2000 monitoring event should provide valuable information regarding potential beneficial impacts of the Army Corp dredging effort; EPA and DEC will consider whether additional sampling locations should be added for this effort. In addition, the year 2000 monitoring results should be utilized by EPA and DEC to evaluate whether the monitoring program should be expanded to include ecological monitoring or toxicity testing. At that time, the EPA and the NYSDEC will consider whether the scope of the monitoring program needs to be modified.

To complete the proposed remedial action, EPA recommends that deed restrictions be placed on the Li Tungsten Site, primarily to prevent the Site from being used for residential purposes. The deed restriction will also include controls to ensure the protection of public health through restrictions on groundwater withdrawals for any purpose that could lead to human exposure e.g., drinking water, irrigation, fountains, etc. until the groundwater

beneath the Site has reached cleanup levels; as well as requiring that any new construction on this Site should adhere to relevant building codes for radon/thoron gases.

During implementation of the selected remedy, best management practices at the Site will also include 1) decommissioning industrial water supply well N1917 on Parcel A, which is screened 311 bgl in the Lloyd Aquifer, in order to prevent any potential transmission of contaminants from the Upper Glacial Aquifer, and 2) draining surface water in ponds on Parcels B and C, concurrent with the excavation of contaminated sediments. Five-year reviews of the Site will also be conducted to ensure the protectiveness of the remedy.

The selected remedy will result in an effective, long-term permanent remedy because all soils with radioactivity greater than the radionuclide cleanup levels will be disposed of at a licensed radiological waste disposal facility. Implementation of the selected remedy will allow redevelopment of the Li Tungsten Superfund Site in substantial conformance with the City of Glen Cove's Revitalization Plan. The accelerated placement of these properties back into a commercially-viable scenario will also meet the primary objective of EPA's "Recycling Superfund Sites" initiative.

EPA and NYSDEC will attempt to expedite the implementation of the soil remedy for the southern portion of the Li Tungsten facility, encompassing Parcel A, lower Parcel B and lower Parcel C. The estimated volume of soil targeted for excavation in these areas is approximately 5,000-6,000 cy, a disproportionately small volume of the facility's contaminated soils. Fast tracking this portion of the remediation would allow for the accelerated placement of this portion of the property back into a commercially viable scenario. This potential action would not only facilitate the City's revitalization of the Creek area, it would also be consistent with EPA's "Recycling Superfund Sites" initiative.

The selected remedy will provide the best balance of trade-offs among alternatives with respect to the evaluating criteria. EPA and NYSDEC believe that the selected remedy will be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions to the maximum extent practicable, as discussed below.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete the selected remedial action for this Site must comply with applicable, or relevant and appropriate environmental standards established

under Federal and State environmental laws unless a waiver from such standards is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource-recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances, as available. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. The selected cleanup levels for soil include 5 parameters from 3 categories, *i.e.*, radionuclides, non-radionuclide heavy metals, and PCBs, to ensure that the excavation removes the contaminants of concern at this Site, which tend to be co-located. Further, the numerical cleanup levels are sufficiently protective from the standpoint of carcinogenic and non-carcinogenic risk for all future on-Site populations except for residential use. Excavating contaminated soils and sediments above the selected cleanup levels and disposing of them off-Site will greatly reduce future human exposures and environmental impacts from the contaminated soils, as well as remove the source of inorganic groundwater contamination. Because the low levels of radionuclides and heavy metals that are left behind may still be technically above their respective regional background levels and above levels considered safe for residential occupation, institutional controls in the form of deed restrictions on residential future use of the properties will help protect human health by limiting the properties to commercial uses.

The selection of no-action for groundwater is considered protective of human health and the environment because of the very low level nature of the groundwater threat. There is virtual certainty that the groundwater in the Upper Glacial Aquifer will not be used for any purpose which could allow for human health or environmental impact. An additional institutional control in this case is provided by the Nassau County Department of Health Ordinance Article 4 which prohibits potable water wells in an area serviced by a municipal water supply. In addition, the remedy provides for decommissioning and hydraulically plugging Industrial Well N1917 on Parcel A, to eliminate a possible conduit for contamination of the deeper, more productive Lloyd Aquifer.

The long-term monitoring of the groundwater in the vicinity of the Site will assess the rate of recovery of the Upper Glacial Aquifer as the localized pockets of heavy metal contamination dissipate in the absence of a contaminant source. The concurrent monitoring of Glen Cove Creek will continue to assess the levels of heavy metals and other contaminants in the Creek during and after soil remedy implementation.

Compliance with ARARS

The National Contingency Plan, Section 300.430 (P)(ii)(B) requires that the selected remedy attain federal and state ARARS. The remedy will comply with the following action-, chemical- and location-specific ARARS identified for the Site and will be demonstrated through monitoring, as appropriate.

Action-Specific ARARS:

- ☐ 40 CFR Part 61 - National Emissions Standards for Hazardous Air Pollutants
- ☐ 40 CFR Part 254.25 - Excavation and Fugitive Dust Emissions
- ☐ 49 CFR 173 - Off-Site Transportation of Radioactive Materials
- ☐ 40 CFR Parts 260-268 - RCRA Standards for Handling, Transportation and Disposal of Hazardous Waste, including Land Disposal Restrictions
- ☐ 6 NYCRR Part 200.6 - Ambient Air Quality Standards
- ☐ 6 NYCRR Parts 370-373 - New York State Standards for Handling, Transportation and Disposal of Hazardous Waste

Chemical-Specific ARARS:

- ☐ 40 CFR Part 141 - Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs)
- ☐ 6 NYCRR Part 703 - New York Water Quality Standards
- ☐ 10 NYCRR Part 5 - New York State Sanitary Code for Drinking Water

Location-Specific ARARS:

- ☐ National Historic Preservation Act
- ☐ U.S. Coastal Zone Management Act

To-Be-Considered:

- ☐ Air Guide I - NYSDEC Control of Toxic Ambient Air Contaminants
- ☐ NYSDEC TAGMs 4003 and 4046 - Hazardous and Radioactive Materials Soil Cleanup Levels

□ 40 CFR 192 - Uranium Mill Tailings Radiation Control
Act (UMTRCA) Standards for Disposal and Control of
Uranium and Thorium Mill Tailings

Cost-Effectiveness

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital costs and O&M costs have been estimated and used to develop present worth costs. In the present-worth cost analysis, annual costs were calculated for 30 years (estimated life of an alternative) using a five percent discount rate and a three percent rate of inflation, with 1999 as the base year. The selected remedy for soil, although it is somewhat more expensive than Alternative LS-3/CS-3, nevertheless was felt to provide correspondingly greater benefits in terms of permanent reductions in toxicity, mobility, and volumes of contaminants, as well as in implementability and community and State acceptance. The selected remedy for groundwater has associated costs for long-term monitoring only, and is therefore relatively inexpensive. The effectiveness of this part of the remedy derives from the removal of the contaminated soils, which should accelerate restoration of the Upper Glacial Aquifer, as well as the very low level of threat posed by the contaminated groundwater to human health and the environment at this Site. For costing purposes, the duration of the monitoring program was assumed to be 30 years; given the fact that the soil excavation will remove the source of the localized groundwater contamination, EPA anticipates that the duration of the monitoring program and its associated cost will be reduced significantly.

The selected remedy will achieve the goals of the response actions and is cost-effective because it will provide the best overall effectiveness in proportion to its cost. For a detailed breakdown of costs associated with the selected remedy, please see Table 18.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy utilizes a permanent solution to the soil contamination which has rendered the Site presently unusable. Implementing the selected remedy will allow the Site to be reused commercially. The City of Glen Cove currently has a final Revitalization Plan which includes commercial use of the properties that are the subject of the selected remedy. EPA believes that the selected remedy is compatible with the City's Revitalization Plan. The selected remedy represents the most appropriate solution to contamination in the soil and groundwater at the Site because it provides the best balance of trade-offs among the alternatives with respect to the nine evaluation criteria.

Alternative radionuclide separation technologies may be employed where effective to reduce the volume of radionuclide-contaminated soil for off-Site disposal. The actual technology utilized will be dependent on the physical properties of the materials to be

excavated, which could vary from place to place on-Site, e.g., depth, method of original deposition, moisture content, levels and types of radionuclides, other co-located contaminants, etc., as well as the degree of safety with which the operation can be achieved, in terms of impacts to both on-Site workers and off-Site populations.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied for soil through the use of measures to reduce the volume of radioactive soil requiring off-Site disposal.

No action, treatment or otherwise, was considered by the Agency to be the best groundwater remedy after evaluating it against the nine criteria.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred remedy presented in the Proposed Plan.

ATTACHMENT 4

STATEMENT OF WORK ("SOW")
REMEDIAL ACTION

LI TUNGSTEN SUPERFUND SITE
CITY OF GLEN COVE, NASSAU COUNTY, NEW YORK

A. WORK TO BE PERFORMED

The Work to be performed by Respondents pursuant to the Unilateral Administrative Order, Index Number CERCLA 02-2000-2037, ("the Order") at the Li Tungsten Superfund Site ("Site") shall, at a minimum, achieve the requirements of the *Final Design Report* to be prepared and approved by EPA pursuant to EPA's May 15, 2000 unilateral administrative order ("RD UAO") for this Site, as well as those requirements of the remedy set forth in the September 30, 1999 Record of Decision (the "ROD") described below. The Work shall not include the implementation of the following portion of the remedy: (a) "Phase 1", as set forth in Paragraph 15 of the Order, and (b) the "Initial Captain's Cove Work", as set forth in paragraph 5.e. of the Order pertaining to the administrative agreement, Index Number CERCLA-02-2000-2019. Notwithstanding the references to the "Initial Captain's Cove Work" herein, if EPA notifies Respondents, in writing, that EPA requires the Respondents to perform the Initial Captain's Cove Work, or any portion thereof, Respondents shall implement those tasks designated by EPA.

The Work shall be performed in a manner consistent with the ROD, its stated Remedial Action Objectives ("RAOs"), the EPA-approved *Final Design Report* required under the RD UAO and the EPA-approved Remedial Action Work Plans required under the Order.

RAOs are EPA's goals for addressing risks at the Site. The following RAOs developed for the Site are intended to mitigate the health and environmental threats posed by radionuclide and heavy metal contamination, as well as by unstable Site structures. The RAOs include:

Building Materials

- Prevent exposure to building materials contaminated with radionuclides or chemicals of concern.
- Eliminate hazards to future Site workers posed by unstable structures.

- Remove any structural impediments that might interfere with pre-design sampling and implementation of soil and groundwater remediation.

Soil/Sediment

- Prevent or minimize exposure to contaminants of concern through inhalation, direct contact, or ingestion.
- Prevent or minimize cross-media impacts from contaminants of concern in soil/sediments migrating into underlying groundwater.

Groundwater/Ponded Water

- Prevent or minimize ingestion, dermal contact, and inhalation of inorganic-contaminated groundwater "hot spot" areas on lower Parcel C and on Parcel A that are above Federal and State Maximum Contaminant Levels ("MCLs").
- Restore groundwater quality to levels which meet Federal and State standards.
- Remediate contaminated surface water in on-Site ponds to reduce risks to public health and the environment.

The Selected Remedy documented in the ROD includes the following major provisions:

- Excavation of soils and sediments contaminated above the cleanup levels specified under Remedial Action Objectives in the ROD, including ROD Table 15 referenced therein - "Soil Cleanup Levels";
- Separation of radionuclide-contaminated soil from non-radionuclide soil contaminated with heavy metals;
- Off-Site disposal of both radionuclide and heavy metals-contaminated soil at appropriately licensed facilities;
- Off-Site disposal of radioactive waste located in the Dickson Warehouse at appropriately licensed facilities;
- Building demolition at the Li Tungsten facility;
- Storm sewer and sump cleanouts at the Li Tungsten facility;

- Institutional controls governing the future use of the Site;
- Collection and off-Site disposal of contaminated surface water from Parcels B and C; and
- Performance of a long-term groundwater monitoring program, to assess the recovery of the Upper Glacial Aquifer after the soil remedy is implemented.

In the event that separation of radionuclide-contaminated soil from non-radionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective and safe manner, the excavated soils will be disposed at appropriately licensed facilities as described in the ROD.

The Work to be performed by Respondents shall be the implementation of those remedial actions needed to achieve the provisions of the Selected Remedy stated above (other than remedial activity performed and to be performed pursuant to "Phase 1" and as part of the "Initial Captain's Cove Work"), as well as to satisfy the intent of the RAOs relevant to that Work. As described in greater detail below, the Work shall include the performance of Remedial Action consistent with the 1999 ROD and the Order. In addition, that portion of the Work which involves the Li Tungsten Property shall include the performance of Remedial Action consistent with the EPA-approved Remedial Design Report to be prepared under the RD UAO.

B. AWARD OF CONTRACT FOR REMEDIAL ACTIVITIES

1. Within fifteen (15) days of EPA's approval of the *Final Design Report* for the Li Tungsten Property, Respondents shall submit to EPA all proposed contractors and subcontractors, as well as all contractor/subcontractor key personnel, who are to perform the Remedial Action Work specified in the EPA-approved *Final Design Report*, the 1999 ROD, and the Order. Selection of any engineer, contractor, or subcontractor shall be subject to approval by EPA. Respondents shall award the contract(s) for this portion of Remedial Action within ten (10) days of EPA's approval. Written notification shall be provided to EPA no later than five days (5) days after contract award.
2. With regard to that portion of the Remedial Action which relates to the Captain's Cove Property, other

than the Initial Captain's Cove Work, Respondents shall submit to EPA within thirty (30) days of EPA's notification to Respondents to initiate the performance of such work all proposed contractors and subcontractors, as well as all contractor/subcontractor key personnel, who are to perform the Remedial Action Work specified in the 1999 ROD and the Order. Selection of any engineer, contractor, or subcontractor shall be subject to approval by EPA. Respondents shall award the contract(s) for this portion of Remedial Action within ten (10) days of EPA's approval. Written notification shall be provided to EPA no later than five days (5) days after contract award.

3. With regard to the Initial Captain's Cove Work, if EPA notifies Respondents in writing that it requires Respondents to perform some portion of the Initial Captain's Cove Work, Respondents shall submit to EPA within thirty (30) days of EPA's notification to Respondents to initiate such work all proposed contractors and subcontractors, as well as all contractor/subcontractor key personnel, who are to perform the Remedial Action Work specified in the 1999 ROD and the Order. Selection of any engineer, contractor, or subcontractor shall be subject to approval by EPA. Respondents shall award the contract(s) for this portion of Remedial Action within ten (10) days of EPA's approval. Written notification shall be provided to EPA no later than five days (5) days after contract award.

C. REMEDIAL ACTION WORK PLANS

1. Respondents shall submit a Remedial Action Work Plan to EPA for the applicable portion of the Work, i.e., remedial activities at either the Li Tungsten Property or the Captain's Cove Property, with a copy to the NYSDEC. With regard to the approval set forth in Section B.1., above, the Remedial Action Work Plan shall be submitted within thirty (30) days of the award of the contract under Section B.1., above. With regard to the approval set forth in Section B.2. and/or B.3, above, the Remedial Action Work Plan shall be submitted within thirty (30) days of an EPA approval of a Remedial Action Contractor(s). The Remedial Action Work Plan(s) shall include a detailed description of the activities, technical approach, operations, monitoring, and overall management strategy

for the specific Remedial Action included in that work plan. Necessary procedures, inspections, deliverables, and schedules shall be specified. Any component/system schedules to be established by the Respondents' selected Remedial Action contractor(s) shall be consistent with the Remedial Action management schedule and final Remedial Action schedule contained therein (see below). The Remedial Action Work Plan(s) shall identify the Remedial Action Project Team (including, but not limited to, the Supervising Contractor).

At a minimum, the Remedial Action Work Plan(s) shall include the following elements:

(a) Remedial Action Schedule

Respondents shall include a schedule for the completion of Remedial Action. For the Remedial Action at the Li Tungsten Property, this schedule shall be from the EPA-approved final Remedial Design Report, and shall provide for completion of the Remedial Action within 10 months of EPA's approval of the Remedial Action Work Plan. The Remedial Action Schedule(s) shall contain information about initiation and completion of all critical path activities, as well as project milestones and deliverables, and provide adequate review times for EPA where appropriate.

(b) Site Management Plan

Respondents shall prepare an updated Site Management Plan ("SMP") for Remedial Action activities. The updated SMP shall include, at a minimum, the following elements:

- (1) Discussion of strategies and methods of Remedial Action operations, including the following:
 - (A) Timing of and manner in which, *inter alia*, activities (e.g., decontamination, excavation, monitoring, security measures, off-site disposal, Site restoration) shall be sequenced;
 - (B) Provisions for security, utilities, decontamination facilities, construction

trailers, equipment storage, contingency procedures, management responsibilities, and waste handling and disposal;

- (C) Coordination of Remedial Action activities;
 - (D) Periodic Site security inspections and maintenance (or enhancement, if necessary) of existing security features during Remedial Action;
 - (E) Coordination with local authorities regarding contingency planning and potential traffic obstruction; and
 - (F) Access to the Site during the Remedial Action, including any periods of inactivity.
- (c) Remedial Waste Management Plan - Respondents shall prepare an updated *Remedial Waste Management Plan* for Remedial Action activities. The *Remedial Waste Management Plan* shall describe the management and disposal of hazardous substances, pollutants, contaminants, or other waste materials that are encountered or generated during Remedial Action. The *Remedial Waste Management Plan* shall include planned on-site and off-site waste transportation routes and temporary on-site waste staging areas, including maps illustrating the location of such areas and methods by which ground water and surface water encountered during the excavation work will be controlled and/or contained and disposed. The *Remedial Waste Management Plan* shall also describe the procedures for the decontamination of construction equipment and the disposal of waste materials generated from those decontamination activities.

D. APPROVAL OF REMEDIAL ACTION WORK PLAN(S)

EPA will either approve the *Remedial Action Work Plan(s)* or require modification(s) in accordance with the procedures set forth in Section XIII of the Order.

E. REMEDIAL ACTION

Upon EPA's written approval of a *Remedial Action Work Plan*, Respondents shall perform the Remedial Action in accordance with the EPA-approved *Remedial Action Work Plan* (and the schedule contained therein), the ROD, the Order, and, for that portion of the Work performed at the Li Tungsten Property, the EPA-approved *Final Design Report*.

During performance of the Remedial Action Work, Respondents may identify and request EPA's approval for field changes to the *Remedial Action Work Plan*, *Final Design Report* or *Remedial Action Schedule* as necessary to complete the Work. EPA will either approve, require modification of, or disapprove any request for field changes in accordance with the procedures set forth in Section XIII of the Order.

1. Pre-Final and Final Inspections

Within fourteen (14) days after completion of all Remedial Action Work required under the Order (other than Long-Term Groundwater Monitoring), Respondents shall schedule and conduct a final inspection to be attended by Respondents, EPA and its representatives, and the NYSDEC. The final inspection will consist of a walk-through of the project to verify the completeness of the Remedial Action. If EPA requires corrective measures to be performed by Respondents, the inspection will be deemed a pre-final inspection. Within fourteen (14) days after completion of any required corrective measures, Respondents and its contractor(s) shall schedule and conduct follow-up inspections, as necessary, to be attended by Respondents, EPA and its representatives, and the NYSDEC, until no further corrective measures are required.

2. Remedial Action Report

After the final inspection, Respondents shall submit a *Remedial Action Report* to EPA for review and approval, with a copy to NYSDEC, within thirty (30) days of the inspection. The *Remedial Action Report* shall be in conformance with the document entitled *Remedial Action Report Guidance* dated June 1992, or any updates thereto. In the Report, a licensed professional engineer who meets any and all requirements of applicable federal, state and local laws, shall state

that the Remedial Action Work has been completed in full satisfaction of all requirements governing its completion, including the *Remedial Action Work Plans*, the *Remedial Design Report*, all approved modifications to all plans and specifications, schedules, reports and other items developed thereunder, the 1999 ROD and the Order.

The *Remedial Action Report* shall include, but not be limited to, the following elements:

(a) Remedial Action Activities

A description shall be provided of the activities undertaken for those portions of the Remedial Action performed under the Order, including time frames, quantity of material excavated, field modifications and their rationale, cleanup levels achieved, materials and/or equipment used, post-excavation activities, including the source(s) of clean fill, the types of fill material used, the final grading and contouring of each area excavated, and all other Site restoration activities. The name(s) and specific role(s) of the Remedial Action contractor(s) shall be provided. Respondents shall verify that all equipment or temporary facilities used during excavation have been decontaminated, dismantled, and removed from the Site, as appropriate. "As built" drawings shall be provided which show all Work, including any field modifications from the *Remedial Design Report* or *Remedial Action Work Plans*. The "as-built" drawings shall be signed and stamped by a professional engineer licensed in the State of New York and employed by a New York licensed engineering firm. Any revisions to the *Remedial Action Report* required by EPA shall be in accordance with the procedures set forth in Section XIII of the Order.

(b) Performance Standards

Respondents shall provide documentation that all Performance Standards set forth in the 1999 ROD and the Order have been met. Each Performance Standard shall be addressed by describing the Standard, the basis for determining that the Standard is met, the location and frequency of the

tests, and the results of confirmatory sampling and analysis. Maps and cross-sections shall be included to depict the confirmatory sampling locations and sampling depths.

(c) Construction Quality Control

Respondents shall provide documentation that the Remedial Action was performed in accordance with all applicable or relevant and appropriate requirements set forth in the 1999 ROD and the Order.

(d) Documentation of Remedial Action Work

In addition to the "as-built" drawings required under E. 2.a., above, Respondents shall submit to EPA and the NYSDEC the final "as-built" drawings for the Work. Respondents shall also furnish photographs, slides and/or videotapes as appropriate to EPA and the NYSDEC that record the progress of the Remedial Action including, at a minimum, the important features of the Site prior to commencement of Remedial Action activities and the appearance of the Site after all such activities have been completed. Visual documentation shall be developed and submitted as part of the monthly progress report.

(e) Pre-Final and Final Inspections

The pre-final and final inspections conducted by Respondents, EPA, and NYSDEC at the completion of the Remedial Action Work shall be documented in the Remedial Action Report. A brief description shall be provided of any deficient construction items reported during the pre-final inspection and subsequently resolved prior to the final inspection, including detailed description of corrective measures undertaken by Respondents. A list of attendees at the inspection(s) shall also be included.

(f) Certification

The Remedial Action Report shall include a certification statement, signed by a responsible

corporate official of one or more of the Respondents, which states the following:

"I certify under penalty of law that this document and all attachments were prepared under my direct supervision or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

3. Approval of Remedial Action Report

EPA will either approve the *Draft Remedial Action Report*, thus making it the *Final Remedial Action Report*, or require modification of it in accordance with the procedures set forth in Section XIII of the Order.

F. LONG-TERM GROUNDWATER MONITORING

1. Upon EPA's approval of the *Remedial Action Report*, Respondents shall continue long-term groundwater monitoring in accordance with the EPA-approved *Long-term Groundwater Monitoring Plan*, to be prepared pursuant to the RD UAO. The Performance Standards for groundwater restoration at the Site are included in the ROD. The 1999 ROD, attached to the Order, lists federal and State maximum contaminant levels ("MCLs") for contaminants detected in the Site groundwater. Respondents shall perform long-term groundwater monitoring until the groundwater Performance Standards have not been exceeded for a period of three (3) consecutive years, or a shorter period if approved by EPA.
2. Final Report for Long-Term Groundwater Monitoring
 - (a) Within ninety (90) days of the completion of Long-Term Groundwater Monitoring, Respondents shall submit to EPA a written report describing the

results of the long-term groundwater monitoring program. The report shall include a certification statement by a responsible corporate official of one or more of the Respondents, which states the following:

"I certify under penalty of law that this document and all attachments were prepared under my direct supervision or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

- (b) EPA will either approve the report required under F.2.(a), above, or require modification of it in accordance with the procedures set forth in Section XIII of the Order.

If EPA determines that groundwater monitoring has not been completed, EPA will notify Respondents in writing that Respondents shall continue to perform Groundwater monitoring in accordance with the EPA-approved *Long-term Groundwater Monitoring Plan* until such time as EPA notifies Respondents that the long-term groundwater monitoring program is completed.

ATTACHMENT 5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

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IN THE MATTER OF THE LI TUNGSTEN      )
SUPERFUND SITE, GLEN COVE, NEW YORK:  )
                                         )
Adamas Carbide Corporation,            )
Advanced Metallurgy, Inc.,             )
  a.k.a. AMI DoDuco, Inc.,             )
Alloy Carbide Company,                 )
Alloys, Inc.,                         )
American National Carbide Company,     )
Carbidie, Inc.,                       )
Chi Mei Corporation,                   )Administrative Order
Contacts, Metals and Welding, Inc.,    )  Index Number
  a.k.a. CMW, Inc.,                   )CERCLA-02-2000-2013
Cyprus Amax Minerals Company,          )
Electrical Contacts, Ltd.,            )
Ex-Cell-O Machine Tool, Inc.,         )
Fansteel, Inc.,                      )
General Electric Company,             )
General Carbide Corporation,          )
Hughes Christensen Company, Inc.,     )
Hydro Carbide Corporation,            )
Kennametal Inc.,                     )
Kulite Tungsten Corporation,          )
Minmetals, Inc.,                     )
Philips Elmet Corporation,            )
Sandvik Inc.,                        )
Teledyne, Inc.,                      )
Valenite-Modco, Ltd.,                )
Vermont American Corporation,         )
Vista Metals, Inc.,                  )
VR/Wesson Company,                   )
W.R. Grace & Co.,                    )
Wah Chang Smelting and Refining      )
  Company of America, Inc.,          )
                                         )
      Respondents.                   )
                                         )
Proceeding Under Section 106(a) of the )
Comprehensive Environmental Response,  )
Compensation, and Liability Act of 1980,)
as amended (42 U.S.C. § 9606(a)).    )
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ADMINISTRATIVE ORDER FOR REMEDIAL DESIGN

I. INTRODUCTION AND JURISDICTION

1. This Administrative Order ("Order") is issued by the United States Environmental Protection Agency ("EPA") to the above-captioned Respondents ("Respondents") to require the performance of certain portions of the remedial design for the remedy described in the Record of Decision dated September 30, 1999 for the Li Tungsten Superfund site (the "Site"), as set forth herein. This Order is issued by EPA under the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. § 9606(a). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580 (52 Fed. Reg. 2926, January 29, 1987), and was further delegated to EPA Regional Administrators on September 13, 1987.

2. EPA has notified the New York State Department of Environmental Conservation ("NYSDEC") of this Order pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

II. PARTIES BOUND

3. This Order shall apply to and be binding upon each Respondent, its agents, successors, assigns, officers, directors, and principals. Respondents are jointly and severally responsible for carrying out all activities required by this Order. Compliance or noncompliance by one or more Respondent with any provision of this Order shall not excuse or justify noncompliance by any other Respondent. No change in the ownership, corporate status, or other control of any Respondent shall alter any of the Respondents' responsibilities under this Order.

4. Each Respondent shall provide a copy of this Order to any prospective owners or successors before a controlling interest in Respondent's assets, property rights, or stock are transferred to the prospective owner or successor. Respondents shall provide a copy of this Order to each contractor, subcontractor, laboratory or consultant retained to perform any Work under this Order, within thirty (30) days after the effective date of this Order or on the date such services are retained, whichever date occurs later. Respondents shall also provide a copy of this Order to each person representing any Respondent with respect to the Site or the Work and shall condition all contracts and subcontracts entered into hereunder upon performance of the Work in conformity with the terms and conditions of this Order. With respect to the

activities undertaken pursuant to this Order, each contractor and subcontractor shall be deemed to be related by contract to the Respondents within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3). Notwithstanding the terms of any contract, Respondents are responsible to the United States for compliance with this Order and for ensuring that their contractors, subcontractors and agents comply with this Order and perform any Work in accordance with this Order.

III. DEFINITIONS

5. Unless otherwise expressly provided herein, terms used in this Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or its implementing regulations. Whenever terms listed below are used in this Order the following definitions shall apply:

a. "Captain's Cove Property" shall mean the parcel approximately 23 acres in size known as the Captain's Cove Condominium Inactive Hazardous Waste Disposal Site, located approximately 1,000 feet west of the Li Tungsten Property on Garvies Point Road (see Attachment 1). The Captain's Cove Property is designated as Site #1-30-032 on the New York State Registry of Inactive Hazardous Waste Disposal Sites.

b. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675.

c. "Day" shall mean a calendar day unless expressly stated to be a business day. "Business day" shall mean a day other than a Saturday, Sunday, or federal holiday. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the close of business of the next business day.

d. "EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

e. "Li Tungsten Property" shall mean the former Li Tungsten facility property, encompassing approximately 26 acres, located at 63 Herhill Road in the City of Glen Cove, New York (see Attachment 1).

f. "National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan

promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, including any amendments thereto.

g. "NYSDEC" shall mean the New York State Department of Environmental Conservation and any successor departments or agencies of the State.

h. "Paragraph" shall mean a portion of this Order identified by an arabic numeral.

i. "Record of Decision" or "ROD" shall mean the EPA document which selected a remedy at the Site and which was issued on September 30, 1999. A copy of the ROD (not including the Appendices other than Table 15) is attached hereto as Attachment 2.

j. "Remedial Action" shall mean those activities, except for Operation and Maintenance, to be undertaken to implement the remedy set forth in the ROD, in accordance with the Remedial Design Work Plan and other plans approved by EPA.

k. "Remedial Design" or "RD" shall mean those activities to be undertaken by Respondents to develop the final plans and specifications for the Remedial Action pursuant to the Remedial Design Work Plan.

l. "Remedial Design Work Plan" shall mean the document submitted by Respondents pursuant to Paragraph 26.a. of this Order and finalized consistent with Section X of this Order.

m. "Respondents" shall mean collectively the Respondents identified in the caption of this Order and individually any of the Respondents identified in the caption of this Order.

n. "Section" shall mean a portion of this Order identified by a roman numeral and includes one or more paragraphs.

o. "Site" shall mean (1) the Li Tungsten Property, and (2) any portion of the Captain's Cove Property where radioactive contamination exists.

p. "State" shall mean the State of New York.

q. "Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design for the Site, as described in the ROD and set forth in detail in Attachment 3 to this Order.

r. "Supervising Contractor" shall mean the principal contractor retained by Respondents to supervise and direct the implementation of the Work under this Order.

s. "United States" shall mean the United States of America.

t. "Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), (2) any "pollutant or contaminant" under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33), (3) any "solid waste" under Section 1004(27) of the Resource Conservation and Recovery Act, ("RCRA") 42 U.S.C. § 6903(27), and (4) any mixture containing any of the constituents noted in (1), (2) or (3), above.

u. "Work" shall mean all activities Respondents are required to perform under this Order, except those required by Section XVIII (Record Preservation). "Work" shall include the design of the remedy set forth in the ROD as it relates to the Li Tungsten Property, but not including the design of "Phase 1" of the remedy, as defined in Paragraph 15, below, or the design of that portion of the remedy which is to be performed at the Captain's Cove Property.

IV. FINDINGS OF FACT AND CONCLUSIONS OF LAW

6. The Site is located in the City of Glen Cove, Nassau County, New York, and is comprised of two areas, the former Li Tungsten Corporation facility at Herbhill Road and Dickson Lane, and certain portions of the former Captain's Cove Condominium development located approximately one-half mile west on Garvies Point Road. As a result of the processing of ores at the facility on the Li Tungsten Property, and the subsequent disposal of portions of the byproducts of that processing, elevated levels of radiation are present at the Li Tungsten Property and portions of the Captain's Cove Property.

7. In 1989 conditions at the Li Tungsten Property resulted in NYSDEC requesting that EPA perform a response action, and on July 21, 1989, EPA entered into an administrative order on consent (Index No. II CERCLA-90215) with Glen Cove Development Company, the owner of record of the Li Tungsten Property at that time. That order required Glen Cove Development Company to conduct a removal action at the Li Tungsten Property.

8. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA identified the Li Tungsten Property as part of the Site, and placed that portion of the Site on the National Priorities List,

set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on October 14, 1992. 57 Fed. Reg. 47180.

9. Commencing in 1993, EPA performed a Remedial Investigation ("RI") at the Site, which confirmed the presence of arsenic, lead, polychlorinated biphenyls, radionuclides (including Radium-226 and Thorium-232), tetrachloroethylene, and trichloroethylene at the Site.

10. EPA determined in November, 1995 that radioactive material present on the Li Tungsten Property could appropriately be linked or aggregated for purposes of a coordinated response with radioactive material similar in nature which is located at the Captain's Cove Property, pursuant to Section 104(d)(4) of CERCLA, and therefore the Site was expanded to include those portions of the Captain's Cove Property where radioactive contamination exists.

11. In addition to the 1989 removal work performed by Glen Cove Development Company and the RI being performed by EPA, EPA performed other removal activities in phases from 1995 through 1998. The EPA removal work involved, among other things, the extraction and decontamination of 271 tanks and the demolition of several buildings at the Site.

12. The RI was completed in May 1998, and a draft Feasibility Study ("FS") report for the Site was thereafter completed by EPA in December 1998. A Proposed Plan for the Site was published in July of 1999, and the Site ROD was issued on September 30, 1999. The remedy selected in the ROD for the Site includes, inter alia, a plan for addressing radioactive materials located at the Site, in addition to other hazardous substances located at the Site, including addressing soil and groundwater contamination at the Site. With regard to soils, the remedy includes (a) the excavation of soils and sediments contaminated above cleanup levels, (b) the separation of radionuclide-contaminated soil from non-radionuclide soil contaminated with heavy metals, to the extent it can be accomplished in a cost-effective manner, and the appropriate off-Site disposal of all radionuclide and metals-contaminated soils at appropriately licensed facilities, including such disposal of radioactive waste currently contained in the Dickson Warehouse located at the Li Tungsten Property, (c) the demolition of buildings at the Li Tungsten Property, (d) storm sewer and sump clean outs at the Li Tungsten Property, (e) the decommissioning of an industrial well at the Li Tungsten Property, (f) the collection and proper off-site disposal of contaminated surface water from the Li Tungsten Property, and (g) establishing institutional controls governing the future use of the Site. As for groundwater, the remedy includes the

prevention or minimization of ingestion, dermal contact, and inhalation of metals-contaminated groundwater at the Li Tungsten Property that is above State and Federal Maximum Contaminant Levels, as well as the restoration of groundwater quality to levels which meet State and Federal standards. To achieve these objectives, the remedy requires a long-term groundwater monitoring program to assess the recovery of the Upper Glacial Aquifer after the soil remedy is implemented.

13. The Captain's Cove Property has been designated by NYSDEC as an inactive hazardous waste disposal site under Article 27, Title 13 of the Environmental Conservation Law of the State of New York. A separate RI and FS were conducted by the City of Glen Cove with respect to the non-radioactive portions of the Captain's Cove Property, and NYSDEC issued a decision document in March of 1999 selecting a remedy to address that area.

14. The Li Tungsten Property and the Captain's Cove Property, which together comprise approximately 49 acres, are identified parcels included in a planned waterfront revitalization effort involving approximately 240 acres in Glen Cove, New York.

15. EPA has commenced the implementation of what is referred to as "Phase 1" of the remedy selected in the ROD. Phase 1 involves: (1) the excavation and collection of contaminated sediments and soils and the demolition of certain buildings (and the segregation of related debris) from an area designated as "Parcel A" on the Li Tungsten Property and from the southern portions of "Parcel B" and "Parcel C" on the Li Tungsten Property (as shown on the Map attached as Attachment 4); (2) off-site disposal of the non-radioactive metals-contaminated sediments, soils, and debris excavated, collected, or demolished pursuant to item (1) above; (3) interim storage on the Li Tungsten Property of the radioactive portion of the sediments, soils, and debris excavated or demolished pursuant to item (1) above; and (4) the decommissioning of an industrial well on Parcel A. Phase 1 does not include any other portion of the remedy selected in the ROD, including, for example, excavation of contaminated sediments and soil from the northern portions of Parcels B and C or the off-site disposal of any radionuclide-contaminated materials.

16. Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in the ROD, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

17. Each Respondent is a "person" as defined under Section 101(21) of CERCLA, 42 U.S.C. § 9601(21). Each Respondent is a "liable" party as defined in Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), and is subject to this Order under Section 106(a) of

CERCLA, 42 U.S.C. § 9606(a). Respondents Teledyne, Inc. and Wah Chang Smelting and Refining Company of America, Inc. (in its own capacity and as successor to National Reconditioning Company and Nare Corporation) were owners and/or operators of all or a portion of the Site during a period when hazardous substances were disposed of there, within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2). Respondents Wah Chang Smelting and Refining Company of America and Teledyne, Inc. also were generators and transporters of hazardous substances disposed of at the Site within the meaning of Section 107(a)(3) and (4) of CERCLA, 42 U.S.C. § 9607(a)(3) and (4). The other Respondents were generators of hazardous substances disposed of at the Site, within the meaning of Section 107(a)(3) of CERCLA, 42 U.S.C. § 9607(a)(3).

18. The substances listed in Paragraph 9 are "hazardous substances" as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

19. The Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

20. The past and present disposal and migration of hazardous substances at and from the Site are "releases" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

21. The actions required by this Order are necessary to protect the public health, welfare, and the environment.

V. DETERMINATION

22. Based on the FINDINGS OF FACT and CONCLUSIONS OF LAW set forth above and the entirety of the administrative record, the Regional Administrator has determined that the release or threatened release of hazardous substances at the Site may present an imminent and substantial endangerment to the public health or welfare or the environment.

VI. ORDER

23. Based on the foregoing, Respondents are hereby ordered, jointly and severally, to comply with all of the terms and provisions of this Order, including all attachments to this Order, all documents incorporated by reference into this Order, and all schedules and deadlines related thereto.

VII. NOTICE OF INTENT TO COMPLY

24. Each Respondent shall provide, not later than five (5) days after the effective date of this Order, written notice to the EPA addressees listed in Paragraph 44 below stating whether it will comply with the terms of this Order. If any Respondent does not unequivocally commit to perform the Work as provided by this Order, it shall be deemed to have violated this Order and to have failed or refused to comply with this Order. Each Respondent's written notice shall describe, using facts that exist on or prior to the effective date of this Order, any "sufficient cause" defenses asserted by said Respondent under Sections 106(b) and 107(c)(3) of CERCLA, 42 U.S.C. §§ 9606(b) and 9607(c)(3). The absence of a response by EPA to the notice required by this Paragraph shall not be deemed to be an acceptance of Respondent's assertions.

VIII. WORK TO BE PERFORMED

25. Selection of Supervising Contractor.

a. All aspects of the Work to be performed by Respondents under this Order shall be under the direction and supervision of a professional engineer licensed in the State of New York (hereinafter, the "Supervising Contractor"), the selection of which shall be subject to approval by EPA. The Supervising Contractor, as well as all other contractors and subcontractors who engage in the "practice of engineering" at the Site on behalf of Respondents, as the "practice of engineering" is defined at Section 7201 of the New York State Education Law, must comply with all applicable New York State legal requirements regarding the practice of engineering within the State of New York, including all applicable requirements of the New York State Education Law and Business Corporation Law. Within ten (10) days after the effective date of this Order, Respondents shall notify EPA in writing of the name, title, and qualifications of any contractor proposed to be the Supervising Contractor. EPA will either approve the proposed contractor, accompanied by an authorization to proceed, or issue a notice of disapproval. If at any time after EPA approves a Supervising Contractor Respondents propose to change that Supervising Contractor, Respondents shall give such notice to EPA and must obtain an approval and an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under this Order.

b. If EPA disapproves a proposed Supervising Contractor, EPA will notify Respondents in writing. Within thirty (30) days of EPA's disapproval of a proposed contractor, Respondents shall submit to EPA a list of contractors (which does not include the

contractor previously disapproved by EPA) that would be acceptable to them, including the qualifications of each contractor. EPA will provide written notice of the names of any contractor(s) that it disapproves and an authorization to proceed with respect to any of the other contractors. Respondents may select any contractor from those not disapproved and shall notify EPA of the name of the contractor selected within twenty-one (21) days of EPA's authorization to proceed.

26. Remedial Design.

a. Within thirty (30) days of EPA's authorization to proceed pursuant to paragraph 25.a., Respondents shall submit to EPA and the State a work plan for the design of the Remedial Action at the Li Tungsten Property portion of the Site ("Remedial Design Work Plan"), excluding the design of Phase 1 of the remedy (as described in Paragraph 15, above). The Remedial Design Work Plan shall provide for the design of the above-described portion of the remedy as set forth in the ROD in accordance with the attached SOW (see Attachment 3).

b. The Remedial Design Work Plan shall include the elements set forth in Section B of the attached SOW, including: a Health and Safety/Contingency Plan, a Quality Assurance/Quality Control Plan, and a Site Management Plan for the RD field activities, as well as plans and schedules for implementation of all remedial pre-design and design tasks identified in the SOW, including preliminary, pre-final and final design submittals. In addition, the Remedial Design Work Plan shall include a preliminary schedule for remedial construction and plans and schedules for obtaining access and, if appropriate, other approvals.

c. Upon approval of the Remedial Design Work Plan by EPA, Respondents shall implement the Remedial Design Work Plan, including the preparation of the elements set forth in Sections D and E of the attached SOW, including: (a) a Wetland Assessment and Mitigation Report, (b) a Stage 1B Cultural Resources Survey Report, (c) a Coastal Zone Consistency Assessment, (d) a Pilot Testing Report, (e) a Preliminary Design Report (30% completion), (f) a Pre-Final Design Report (95% completion), (g) a Long-term Groundwater Monitoring Plan, and (h) a Final Design Report (100% completion). The design reports shall be submitted to EPA in accordance with the schedule set forth in the EPA-approved Remedial Design Work Plan and the attached SOW, as approved pursuant to Section X (EPA Review of Submissions). Unless otherwise directed by EPA, Respondents shall not commence further Remedial Design activities at the Site prior to approval of the Remedial Design Work Plan.

d. The Pre-final and Final Remedial Design Reports shall include the elements set forth in Section D.3. of the attached SOW, including: (1) Remedial Action Schedule; (2) Design Specifications and Plan Drawings; (3) CQAPP; and (4) an updated Health and Safety/Contingency Plan. The CQAPP, which shall detail the approach to quality assurance during construction activities at the Site, shall specify a quality assurance official, independent of the Supervising Contractor, to conduct a quality assurance program during the construction phase of the project. EPA will approve or require modifications to the Final Design Report (and the other deliverables submitted by Respondents during the remedial design phase) in accordance with the procedures set forth in Section X (EPA Review of Submissions) of the Order.

IX. ENDANGERMENT AND EMERGENCY RESPONSE

27. ~~In the event of any action or occurrence during the~~ performance of the Work which causes or threatens to cause a release of a hazardous substance or which may present an immediate threat to public health or welfare or the environment, Respondents shall immediately take all appropriate action to prevent, abate, or minimize the threat, and shall immediately notify the Remedial Project Manager ("RPM") or, if the RPM is unavailable, the Chief of the New York Remediation Branch of the Emergency and Remedial Response Division of EPA Region II. Respondents shall take such action in consultation with the RPM and in accordance with all applicable provisions of this Order, including the Health and Safety Plan.

28. Nothing in the preceding Paragraph shall be deemed to limit any authority of the United States to take, direct, or order all appropriate action to protect human health and the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances on, at, or from the Site.

X. EPA REVIEW OF SUBMISSIONS

29. After review of any deliverable, plan, report or other item which is required to be submitted for review and approval pursuant to this Order, EPA may (a) approve the submission, (b) approve the submission with modifications, (c) disapprove the submission and direct Respondents to re-submit the document after incorporating EPA's comments, or (d) disapprove the submission and assume responsibility for performing all or any part of the response action. As used in this Order, the terms "approval by EPA," "EPA approval," or a similar term shall mean the action described in subparagraphs (a) or (b) of this Paragraph.

30. In the event of approval or approval with modifications by EPA, Respondents shall proceed to take any action required by the plan, report, or other item, as approved or modified by EPA.

31. Upon receipt of a notice of disapproval or a request for a modification, Respondents shall, within twenty-one (21) days, correct the deficiencies and resubmit the plan, report, or other item for approval. Notwithstanding the notice of disapproval, or approval with modifications, Respondents shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission.

32. If upon the first resubmission or upon any subsequent resubmission, the plan, report or other item is disapproved by EPA, Respondents shall be deemed to be out of compliance with this Order. In the event that a resubmitted plan, report or other item, or portion thereof, is disapproved by EPA, EPA may again require that Respondents correct the deficiencies, in accordance with the preceding Paragraphs of this Section. In addition, or in the alternative, EPA retains the right to amend or develop the plan, report or other item.

33. All plans, reports, and other submittals required to be submitted to EPA under this Order shall, upon approval by EPA, be deemed to be incorporated in and an enforceable part of this Order. In the event EPA approves a portion of a plan, report, or other item required to be submitted to EPA under this Order, the approved portion shall be deemed to be incorporated in and an enforceable part of this Order.

XI. REPORTING REQUIREMENTS

34. a. In addition to any other requirement of this Order, Respondents shall prepare and provide to EPA written monthly progress reports which: (1) describe the actions which have been taken toward achieving compliance with this Order during the previous month; (2) include all results of sampling and tests and all other data received by Respondents during the previous month in the implementation of the Work; (3) describe all actions, data and plans which are projected to be commenced or completed during the next month and provide other information relating to the progress of the Work; (4) include information regarding percentage of completion, all delays encountered or anticipated that may affect the future schedule for completion of the RD, and a description of all efforts made to mitigate those delays or anticipated delays. These reports are to be submitted to EPA by the fifteenth day of every month following the effective date of this Order.

b. Upon the occurrence of any event during performance of the Work which, pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, requires reporting to the National Response Center, Respondents shall, within twenty-four (24) hours, orally notify the EPA RPM, or, in the event of the unavailability of the EPA RPM, the Chief of the New York Remediation Branch of the Emergency and Remedial Response Division, EPA Region II, in addition to the reporting required by CERCLA Section 103. Within twenty (20) days of the onset of such an event, Respondents shall furnish EPA with a written report setting forth the events which occurred and the measures taken, and to be taken, in response thereto.

c. All reports and other documents submitted by Respondents to EPA (other than the monthly progress reports discussed above) which purport to document Respondents' compliance with the terms of this Order shall be signed by a responsible official of one or more of the Respondents.

d. On request of EPA and subject to any claims of applicable privilege(s), Respondents shall submit to EPA all documents in their possession, custody, or control relating to Respondents' performance of the Work required by this Order.

XII. QUALITY ASSURANCE, SAMPLING AND DATA ANALYSIS

35. a. Respondents shall complete and submit any QA/QC plan(s) in accordance with the EPA publication "Test Methods for Evaluating Solid Wastes" ("SW-846") (3rd Ed.), the "Region II CERCLA Quality Assurance Manual" (October 1989), and the EPA documents entitled "EPA Requirements for Quality Assurance Project Plans for Environmental Data Operation" (EPA QA/R5) and "Preparing Perfect Project Plans" (EPA/600/9-88/087), or any revised versions thereof.

b. Respondents shall use QA/QC procedures in accordance with the QA/QC Plan(s) submitted and approved by EPA pursuant to this Order, and shall use standard EPA Chain of Custody procedures, as set forth in the National Enforcement Investigations Center Policies and Procedures Manual (November 1984), the National Enforcement Investigations Center Manual for the Evidence Audit (September 1981), and Section 1.3 of SW-846, or any amended versions thereof, while conducting all sample collection and analysis activities required herein by any plan. To provide quality assurance and maintain quality control, Respondents shall:

i. Ensure that all contracts with laboratories used by Respondents for the analysis of samples taken pursuant to this Order provide for access of EPA personnel and EPA-authorized

representatives to assure the accuracy of laboratory results related to the Site;

ii. Ensure that the laboratories utilized by Respondents for the analysis of samples taken pursuant to this Order perform all analyses according to accepted EPA methods. Accepted EPA methods consist of those methods which are documented in the "Contract Lab Program Statement of Work for Inorganic Analysis" (Revision No. 11, 1992) and the "Contract Lab Program Statement of Work for Organic Analysis" (Revision 9, 1994), and any amendments thereto (including amendments made during the course of the implementation of this Order);

iii. Ensure that all laboratories used by Respondents for analysis of samples taken pursuant to this Order participate in an EPA or EPA-equivalent QA/QC program; and

iv. Ensure that the laboratories used by Respondents for the analysis of samples taken pursuant to this Order analyze samples that EPA may submit to those laboratories for purposes of insuring that the laboratories meet EPA-approved QA/QC requirements.

36. Respondents shall notify EPA not less than fourteen (14) days in advance of any sample collection activity. At the request of EPA, Respondents shall allow split or duplicate samples to be taken by EPA or its authorized representatives of any samples collected by Respondents with regard to the Site or pursuant to the implementation of this Order. In addition, EPA shall have the right to take any additional samples that EPA deems necessary.

XIII. COMPLIANCE WITH APPLICABLE LAWS

37. All activities undertaken by Respondents pursuant to this Order shall be performed in accordance with the requirements of all applicable federal and State laws and regulations. EPA has determined that the activities contemplated by this Order are consistent with the NCP.

38. Except as provided in Section 121(e) of CERCLA and the NCP, no permit shall be required for any portion of the Work conducted entirely on-Site. Where any portion of the Work requires a federal, State, or local permit or approval, Respondents shall submit timely applications and take all other actions necessary to obtain and to comply with all such permits or approvals.

39. This Order is not, and shall not be construed to be, a permit issued pursuant to any federal, State, or local statute or regulation.

40. a. Any off-Site transfer, treatment, storage, or disposal of Waste Material by Respondents must be in compliance with the applicable requirements of RCRA, 42 U.S.C. §§ 6901-6991, Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), the Toxic Substances Control Act, 15 U.S.C. § 2601, et seq., as well as their implementing regulations, and all other applicable laws, including, but not limited to, 40 C.F.R. Parts 262 and 263 and 6 NYCRR Part 372. Furthermore, Respondents shall provide notice to EPA of any facilities that Respondents propose to use for such off-Site transfer, storage, treatment, or disposal at least seven (7) business days prior to the commencement of any such use, and shall include the proposed facility's EPA RCRA ID # and the anticipated method of treatment or disposal. Respondents shall also obtain approval by EPA's RPM in advance of the use of such facilities. Any and all off-Site disposal activities conducted by Respondents under this Order shall be performed in conformance with the NCP (including Section 300.440 of the NCP, 40 C.F.R. § 300.440) and any amendments thereto.

b. If Waste Material from the Site is to be shipped to a waste management facility outside of New York State, Respondents shall provide prior written notification of such shipment of Waste Material to the appropriate state environmental official in the receiving facility's state (with a copy to the EPA RPM). However, this notification requirement shall not apply to any off-Site shipments when the total volume of all such shipments will not exceed 10 cubic yards. Respondents shall include in the written notification the following information: (i) the name and location of the facility to which the Waste Material is to be shipped; (ii) the type and quantity of the Waste Material to be shipped; (iii) the expected schedule for the shipment of the Waste Material; and (iv) the method of transportation. Respondents shall provide such notification to the receiving facility's state and to EPA in writing as soon as practicable, but in any event at least ten (10) business days prior to the said shipments. Respondents shall notify the receiving facility's state of major changes in their shipment plan, such as a decision to ship the Waste Material to another facility within the same state.

XIV. RPM, PROJECT COORDINATOR, NOTIFICATION

41. EPA has designated the following individual as its RPM at the Site:

Edward Als
New York Remediation Branch
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway
New York, NY 10007-1866
(212) 637-4272

42. If EPA changes its RPM, EPA will inform Respondents in writing of the name, address, and telephone number of the new RPM. The RPM shall have the authority lawfully vested in an RPM and On-Scene Coordinator by the NCP. The RPM shall have authority, consistent with the NCP, to halt any work required by this Order and to take any necessary response action.

43. Within ten (10) days after the effective date of this Order, Respondents shall designate a Project Coordinator and shall submit the name, address, telephone number, qualifications and job title of the Project Coordinator to EPA for review and approval. Respondents' Project Coordinator shall be responsible for overseeing Respondents' implementation of this Order. If Respondents wish to change their project Coordinator, Respondents shall provide written notice to EPA, five (5) days prior to changing the Project Coordinator, of the name and qualifications of the new Project Coordinator. Respondents' selection of a Project Coordinator shall be subject to EPA approval.

44. All plans, reports, notices and other documents required to be submitted to EPA under this Order shall be directed to the following individuals at the addresses specified below:

a. As to EPA:

2 copies (or 5 copies if such communication is a plan or report):

Chief, New York Remediation Branch
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway
New York, NY 10007-1866
Attention: Li Tungsten Superfund Site Remedial
Project Manager

All required written communications other than work plans, design documents, and technical reports shall also be sent to the following:

1 copy: Chief, New York/Caribbean Superfund Branch
Office of Regional Counsel
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866
Attention: Li Tungsten Superfund Site Attorney

b. In addition, when submitting any written communication required hereunder to EPA, Respondents shall simultaneously submit 2 copies (or 7 copies if such communication is a plan or report) of that communication to the State at the following address:

Michael J. O'Toole, Jr.
Director, Division of Environmental Remediation
N.Y.S. Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

Attention: Li Tungsten Site Engineer

XV. OVERSIGHT

45. During the implementation of the requirements of this Order, Respondents and their contractors and subcontractors shall be available for such conferences and inspections with EPA as EPA may determine are necessary for EPA to adequately oversee the Work being carried out and/or to be carried out.

46. Respondents and their employees, agents, contractors, representatives and consultants shall cooperate with EPA in its efforts to oversee Respondents' implementation of this Order.

XVI. COMMUNITY RELATIONS

47. Respondents shall cooperate with EPA in providing information regarding the Site or the Work to the public. As requested by EPA, Respondents shall participate in the preparation of such information for distribution to the public and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site.

XVII. SITE ACCESS AND DATA/DOCUMENT AVAILABILITY

48. If the Site, or any other property where access is needed to implement this Order, is owned or controlled by a Respondent, then commencing on the effective date of this Order, such Respondent shall provide EPA, NYSDEC, and their representatives, including their contractors, with access at all reasonable times

to the Site, or such other property, for the purpose of conducting any activity related to this Order, including the following activities:

- i. Monitoring the Work;
- ii. Verifying any data or information submitted to EPA;
- iii. Conducting investigations relating to contamination at or near the Site;
- iv. Obtaining samples;
- v. Assessing the need for, planning, or implementing additional response actions at or near the Site;
- vi. Implementing any Work pursuant to Paragraph 63 of this Order;
- vii. Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Respondents or their agents, consistent with Section XVIII (Record Preservation); and
- viii. Assessing Respondents' compliance with this Order.

49. If the Li Tungsten Property, or any other property where access is needed to implement this Order, is owned or controlled by persons other than Respondents, Respondents shall use best efforts to secure from such persons, within 45 days of the effective date of this Order, an agreement to provide access thereto for Respondents, as well as for EPA, NYSDEC, and their respective representatives (including contractors), for the purpose of conducting any activity related to this Order, including those activities listed in Paragraph 48 of this Order. Any access agreements entered into by Respondents and the entity owning or controlling the property shall specify that Respondents are not EPA's representatives with respect to liability associated with Site activities. For purposes of this Paragraph, "best efforts" includes the payment of reasonable sums of money in consideration of access. If any access required by this Paragraph is not obtained within 45 days of the effective date of this Order, Respondents shall promptly notify EPA in writing, and shall include in that notification a summary of the steps that Respondents have taken to attempt to comply with this Paragraph.

Subject to the United States' non-reviewable discretion, EPA may use its legal authorities to obtain access for the Respondents, may perform those response actions with EPA contractors at the property in question, or may terminate the Order if Respondents cannot obtain access agreements. If EPA performs those tasks or activities with its own contractors and does not terminate the Order, Respondents shall perform all other activities not requiring access to the given property. Respondents shall integrate the results of any such tasks undertaken by EPA into their reports and deliverables.

50. All data, records, photographs and other information created, maintained or received by Respondents or their agents, contractors or consultants in connection with implementation of the Work under this Order, including but not limited to contractual documents, quality assurance memoranda, raw data, field notes, laboratory analytical reports, invoices, receipts, work orders and disposal records, shall, without delay, be made available to EPA on request. EPA shall be permitted to copy all such documents and other items.

51. Upon request by EPA or its designated representatives, Respondents shall provide EPA or its designated representatives with duplicate and/or split samples of any material sampled in connection with the implementation of this Order, or allow EPA or its designated representatives to take such duplicate or split samples.

52. Notwithstanding any provision of this Order, EPA retains all of its access authorities and rights, including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulation.

53. Respondents may assert a claim of business confidentiality covering part or all of the information submitted to EPA pursuant to the terms of this Order under 40 C.F.R. § 2.203, provided such claim is not inconsistent with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), or other provisions of law. This claim shall be asserted in the manner described by 40 C.F.R. § 2.203(b) and substantiated by Respondents at the time the claim is made. Information determined to be confidential by EPA will be given the protection specified in 40 C.F.R. Part 2. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA or the State without further notice to the Respondents. Respondents shall not assert confidentiality claims with respect to any data related to Site conditions, sampling, or monitoring.

54. Respondents shall maintain for the period during which this Order is in effect an index of documents that Respondents claim contain confidential business information. The index shall contain, for each document, the date, author, addressee, and subject of the document. Upon written request from EPA, Respondents shall submit a copy of the index to EPA.

XVIII. RECORD PRESERVATION

55. Respondents shall provide to EPA, upon request, copies of all documents and information within their possession and/or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Order, including records pertaining to sampling, analysis, or chain of custody procedures manifests, trucking logs, receipts, reports, correspondence, or other documents or information related to the Work.

56. Until ten (10) years after completion of the Work, Respondents shall preserve and retain all records and documents in their possession or control, including the documents in the possession or control of their contractors and agents that relate in any manner and to the performance of the Work. At the conclusion of this document retention period, Respondents shall notify the United States at least ninety (90) calendar days prior to the destruction of any such records or documents, and upon request by the United States Respondents shall deliver any such records or documents to EPA.

XIX. DELAY IN PERFORMANCE.

57. Any delay in performance of this Order that, in EPA's judgment, is not properly justified by Respondents under the terms of this Section shall be considered a violation of this Order. Any delay in performance of this Order shall not affect Respondents' obligations to perform all obligations fully under the terms and conditions of this Order.

58. Respondents shall notify EPA of any delay or anticipated delay in performing any requirement of this Order. Such notification shall be made by telephone to EPA's RPM within forty-eight (48) hours after Respondents first knew or should have known that a delay might occur. Respondents shall adopt all reasonable measures to avoid or minimize any such delay. Within seven (7) days after notifying EPA by telephone, Respondents shall provide written notification fully describing the nature of the delay, any justification for the delay, any reason why Respondents should not be held strictly accountable for failing to comply with any relevant requirements of this Order, the

measures planned and taken to minimize the delay, and a schedule for implementing the measures that have been or will be taken to mitigate the effect of the delay. Increased costs or expenses associated with implementation of the activities called for in this Order is not a justification for any delay in performance.

XX. FINANCIAL ASSURANCE AND INSURANCE

59. Respondents shall demonstrate their ability to complete the Work required by this Order and to pay all claims that arise from the performance of the Work by obtaining and presenting to EPA within thirty (30) days of the effective date of this Order one of the following; (1) a performance bond; (2) a letter of credit; (3) a guarantee by a third party; or (4) internal financial information to allow EPA to determine that Respondents have sufficient assets available to perform the Work. If EPA determines that such financial information is inadequate, Respondents shall, within thirty (30) days after receipt of EPA's notice of determination, obtain and present to EPA for approval one of the other three forms of financial assurance listed above.

60. At least seven (7) days prior to commencing any Work at the Site pursuant to this Order, Respondents shall submit to EPA a certification that Respondents or their contractors and subcontractors have adequate insurance coverage or have indemnification for liabilities for injuries or damages to persons or property which may result from the activities to be conducted by or on behalf of Respondents pursuant to this Order. Respondents shall ensure that such insurance or indemnification is maintained for the duration of the Work required by this Order.

XXI. UNITED STATES NOT LIABLE

61. The United States, by issuance of this Order, assumes no liability for any injuries or damages to persons or property resulting from acts or omissions by Respondents, or their directors, officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order. Neither EPA nor the United States may be deemed to be a party to any contract entered into by Respondents or their directors, officers, employees, agents, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order.

XXII. ENFORCEMENT AND RESERVATIONS

62. EPA reserves the right to bring an action against Respondents under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any response costs incurred by the United States in connection with the Site. This reservation shall include, but not be limited to past costs, future costs, direct costs, indirect costs, the costs of oversight, as well as accrued interest as provided in Section 107(a) of CERCLA.
63. Notwithstanding any other provision of this Order, at any time during the RD, EPA may perform its own RD, complete the RD (or any portion of the RD) as provided in CERCLA and the NCP, and seek reimbursement from Respondents for its costs, or seek any other appropriate relief.
64. Nothing in this Order shall preclude EPA from taking any additional enforcement actions, including modification of this Order or issuance of additional orders, and/or additional remedial or removal actions as EPA may deem necessary, or from requiring Respondents in the future to perform additional activities pursuant to CERCLA or any other applicable law.
65. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection and enforcement authorities and rights under CERCLA, RCRA, and any other applicable statute or regulation.
66. Respondents shall be subject to civil penalties under Section 106(b) of CERCLA, 42 U.S.C. § 9606(b), of not more than \$27,500 for each day in which Respondents willfully violate, or fail or refuse to comply with this Order without sufficient cause. In addition, failure to properly provide response action under this Order, or any portion hereof, without sufficient cause, may result in liability under Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), for punitive damages in an amount at least equal to, and not more than three times, the amount of any costs incurred by EPA as a result of such failure to take proper action.
67. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action, or demand in law or equity against any person for any liability it may have arising out of or relating in any way to the Site.
68. If a court issues an order that invalidates any provision of this Order or finds that any one or more of the Respondents have sufficient cause not to comply with one or more provisions of this Order, Respondents, or the remaining Respondents, as the

case may be, shall remain bound to comply with all provisions of this Order not invalidated by the court.

XXIII. EFFECTIVE DATE AND COMPUTATION OF TIME

69. This Order shall be effective fourteen (14) days after receipt by Respondents, unless a conference is timely requested pursuant to Paragraph 70, below. If such conference is timely requested, this Order shall become effective three (3) days following the date the conference is held, unless the effective date is modified by EPA. All times for performance of ordered activities shall be calculated from this effective date.

XXIV. OPPORTUNITY TO CONFER

70. Respondents may, within ten (10) days after receipt of this Order, request a conference with EPA to discuss this Order. If requested, the conference shall occur within seven (7) days of Respondents' request for a conference.

71. The purpose and scope of the conference shall be limited to issues involving the implementation of the Work required by this Order and the extent to which Respondents intend to comply with this Order. This conference is not an evidentiary hearing, and does not constitute a proceeding to challenge this Order. It does not give Respondents a right to seek review of this Order, or to seek resolution of potential liability, and no official stenographic record of the conference will be made. At any conference held pursuant to any Respondent's request, Respondents may appear in person or by an attorney or other representative.

72. Requests for a conference must be by telephone to James Doyle, Assistant Regional Counsel, Office of Regional Counsel, EPA Region II, telephone (212) 637-3165, followed by written confirmation mailed that day to Mr. Doyle and the RPM at the addresses set forth in Section XIV (RPM, Project Coordinator, Notification) of this Order.

XXV. TERMINATION AND SATISFACTION

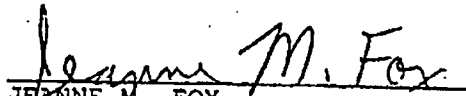
73. This Order will be terminated by EPA if Respondents demonstrate in writing and certify to the satisfaction of EPA that all Work and activities required under this Order, including any additional work required by EPA, have been performed fully in accordance with this Order and EPA has approved the certification in writing. Such an approval by EPA, however, shall not relieve Respondents of any remaining obligations under this Order, including those requirements set forth in Section XVIII (Record Preservation) regarding record preservation. Respondents'

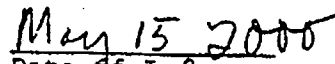
written submission under this Paragraph shall include a sworn statement by a responsible official of Respondents which states the following:

"After thorough investigation, I certify that the information contained in or accompanying this certification is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

For purposes of this Order, a responsible official is a corporate official who is in charge of a principal business function.

U.S. ENVIRONMENTAL PROTECTION AGENCY


JEANNE M. FOX
Regional Administrator
U.S. Environmental Protection Agency
Region II


Date of Issuance

ATTACHMENT 6

